

AD _____

GRANT NUMBER DAMD17-95-1-5075

TITLE: Improving Navy Women's Health: Preventing Smoking Relapse After Recruit Training

PRINCIPAL INVESTIGATOR: Terry L. Conway, Ph.D.

CONTRACTING ORGANIZATION: San Diego State University Foundation
San Diego, California 92182-1931

REPORT DATE: March 1999

TYPE OF REPORT: Final

PREPARED FOR: Commander
U.S. Army Medical Research and Materiel Command
Fort Detrick, Frederick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for public release;
distribution unlimited

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

DTIC QUALITY INSPECTED 4

19991108 096

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE March 1999	3. REPORT TYPE AND DATES COVERED Final (18 Sep 95 - 28 Feb 1999)
4. TITLE AND SUBTITLE Improving Navy Women's Health: Preventing Smoking Relapse After Recruit Training			5. FUNDING NUMBERS DAMD17-95-1-5075
6. AUTHOR(S) Terry L. Conway, Ph.D.			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) San Diego State University Foundation San Diego, California 92182-1931			8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Commander U.S. Army Medical Research and Materiel Command Fort Detrick, Frederick, Maryland 21702-5012			10. SPONSORING/MONITORING AGENCY REPORT NUMBER
11. SUPPLEMENTARY NOTES			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution unlimited			12b. DISTRIBUTION CODE
13. ABSTRACT (Maximum 200) Smoking is a modifiable behavior that is negatively related to women's health and physical readiness, and is a behavior that increases the burden on military health care systems. This behavior is of particular concern to the DoD because military women are more likely to smoke than their civilian counterparts and because women have greater difficulty quitting than do men. The present study, funded by the Defense Women's Health Research Program (DWHRP), tested an innovative approach to reducing smoking among Navy women by evaluating two different relapse-prevention interventions that support maintenance of the "quit status" organizationally mandated during basic training. Women smokers (n=3,036) were assigned either to a control group or one of two intervention groups at entry into basic training. One intervention group was encouraged to access a telephone helpline for counseling to remain a nonsmoker; the other group received a series of monthly mailings. Analysis of smoking rates at 3-, 6-, and 12-months post-graduation were completed to evaluate the effectiveness of the interventions in maintaining the "cold turkey" smoking cessation induced during recruit training. At each of the assessment points post recruit training, quit rates were higher than expected "spontaneous" quit rates, indicating an impact of the totally smoke-free recruit training environment. However, there were no phone or mail intervention effects, suggesting the need for stronger efforts to lower smoking rates among military personnel.			
14. SUBJECT TERMS - Navy Women - Smoking relapse prevention - Longitudinal follow-up - Recruit smoking ban - Telephone counseling - Mail Intervention			15. NUMBER OF PAGES 186
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unlimited

FOREWORD

Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the U.S. Army.

() Where copyrighted material is quoted, permission has been obtained to use such material.

() Where material from documents designated for limited distribution is quoted, permission has been obtained to use the material.

() Citations of commercial organizations and trade names in this report do not constitute an official Department of the Army endorsement or approval of the products or services of these organizations.

() In conducting research using animals, the investigator(s) adhered to the "Guide for the Care and Use of Laboratory Animals," prepared by the Committee on Care and Use of Laboratory Animals of the Institute of Laboratory Animal Resources, National Research Council (NIH Publication No. 86-23, Revised 1985).

() For the protection of human subjects, the investigator(s) have adhered to policies of applicable Federal Law 32 CFR 219 and 45 CFR 46.

() In conducting research utilizing recombinant DNA technology, the investigator(s) adhered to current guidelines promulgated by the National Institutes of Health.


Principal Investigator's Signature

March 1999
Date

Table of Contents

	<u>Page</u>
<i>Statement of Work</i>	<i>iii</i>
<i>I. Introduction</i>	<i>1</i>
A. Nature of the Problem.....	1
B. Background and Previous Work.....	1
C. Purpose of Present Work	3
1. <i>Hypotheses</i>	3
2. <i>Technical Objectives</i>	4
<i>II. Body</i>	<i>5</i>
A. Methods	5
1. <i>Study Setting</i>	5
2. <i>Participants</i>	5
3. <i>Design</i>	5
4. <i>Follow-up Tracking Procedures</i>	6
5. <i>Survey Procedures</i>	6
6. <i>Description of Interventions</i>	8
7. <i>Measures</i>	9
8. <i>Analyses</i>	10
B. Results.....	10
1. <i>Participation in Intervention and Assessment</i>	10
2. <i>Extent of Intervention Delivery</i>	11
3. <i>Smoking and Cessation Experiences at Entry to Recruit Training</i>	11
4. <i>Agreement among Entry Smoking Items regarding Status as a Never Smoker</i>	17
5. <i>Correlates of Smoking at Entry</i>	17
6. <i>Comparison with Civilian Rates</i>	18
7. <i>Effects of the Smoking Ban on Perceptions and Intentions at Graduation</i>	28
8. <i>Short-term Smoking Relapse Rates at the 3-month Follow-up</i>	43
9. <i>Intervention Effects and Smoking Relapse up to 12-months after RTC</i>	54
10. <i>Publications, Presentations, and Awards (cumulative)</i>	59
<i>III. Conclusions/Discussion</i>	<i>61</i>
A. Findings	61
1. <i>Smoking and Cessation Experiences at Entry to RTC</i>	61
2. <i>Standardized Comparison of Recruits and Civilians</i>	62
3. <i>Correlates of Smoking at Entry to RTC</i>	63

4. <i>Effects of Involuntary Cessation on Smoking Perceptions and Intentions at Graduation</i>	65
5. <i>Effects of Involuntary Cessation at RTC on Smoking at the 12-month Follow-up</i> ...	65
6. <i>Correlates of Smoking Relapse</i>	69
7. <i>Intervention Effects</i>	70
 B. Accomplishments and Challenges	71
 IV. References	73
 V. Appendices	82

Statement of Work

Year 3--Plus Extension through February 1999

Goals:

Complete data collection, intervention efforts, data processing and analyses; submit final report.

Tasks:

A) Complete 12-month follow-up data collection. [month 4]

Completed. Collection of the final 12-month follow-up data was extended through the end of August 1998. This extended data collection period was undertaken to increase the response rate to the final survey, and was made possible through implementation of a no-cost extension.

B) Complete post-RTC relapse-prevention/cessation-support intervention efforts. [month 3 for mail and month 5 for helpline]

Completed. The mail intervention was completed in March 1998; the helpline support ended in June 1998.

C) Complete data processing and analyses. [months 6-9]

Completed. Due to the no-cost extension to increase 12-month followup rate, data processing was completed December 1998; data analyses have been ongoing in preparation for the final report.

D) Summarize results for final report and publications. [months 10-12]

Completed. Final report submitted for approval.

Milestones:

A) Submit final report.

Final report submitted (see below).

- B) *Report study findings on the prevalence of women smokers at entry into the Navy in comparison with changes in self-reported smoking status after eight weeks in the "smoke free" recruit training environment, and at the 3-, 6-, and 12-month follow-up assessment.*

See findings in the Results section of this report. Additional findings are reported in various publications (see Appendices).

- C) *Report findings on the relative efficacy of the post-RTC 1-888-helpline versus mail support, and compare each to the effectiveness of exposure only to the Navy's standard policy and tobacco use cessation education in basic training.*

See Results section of this report.

I. Introduction

A. Nature of the Problem

One of the primary goals of the Defense Women's Health Research Program (DWHRP) is to solve problems faced by servicewomen that will directly improve their safety, health, and military effectiveness. Facilitating nonsmoking among military women clearly fits within this DWHRP goal. Currently, smoking rates remain higher among military personnel than among civilians (Bray, Kroutil & Marsden, 1995; Bray, Kroutil, Wheelless, Marsden, Bailey et al., 1995), underscoring the need for special efforts within the military to reduce this problem. Furthermore, research indicates that women have greater difficulty quitting smoking, and remaining quit, than do men. Thus, gender-specific interventions are needed that are effective in reducing tobacco use specifically among military women.

Tobacco use is an important issue when considering the factors that can influence military effectiveness/readiness. For example, smokers tend to exercise less and perform more poorly on military physical fitness tests (Conway & Cronan, 1992, 1988). This is a particularly important issue as military women prepare to go into job ratings previously unavailable to women, in large part because many of these jobs are very physically demanding. Thus, supporting healthful behaviors, discouraging unhealthful behaviors, and understanding the gender-specific factors that might support or inhibit such behaviors will become an even more important concern as women branch into virtually all domains of military operations.

The Department of Defense has recently become the largest employer in the US to mandate a total smoke-free workplace ban in which smoking is prohibited in virtually all indoor work spaces (DoD, 1994). This ban, although highly laudable from a health and readiness perspective, will place additional burdens (psychological, physiological, and temporal--i.e., time and location constraints for smoking) on military personnel who continue to smoke. Degradation of morale among smokers is also a concern. Consequently, it is to the military's advantage to support efforts that maintain the cessation state that is achieved by all military recruit smokers going through basic training in all four services. Estimating that over 30% of incoming military recruits are smokers, it is clear that the military's smoking prevalence would be dramatically lowered within a decade if a high percentage of incoming recruit smokers could *maintain* the "quit status" organizationally mandated during basic training.

B. Background and Previous Work

Recent civilian trends indicate that the prevalence of smoking and the burden of tobacco-related disease is shifting, as the smoking rates of young adult women are beginning to exceed those of men (Pirie, Murray & Luepker, 1991; Pierce, Fiore, Novotny et al., 1989; USDHHS, 1988; Remington, Forman, Gentry, et al., 1985.) Of particular concern to the DoD, a study comparing substance use in standardized samples of civilians and military personnel concluded that military women are more likely to smoke and to smoke heavier than their civilian counterparts (Bray, Marsden & Peterson, 1991; Bray et al., 1995). Another study reported a 50% smoking rate

among women entering the US Navy compared to a 41% rate for men (Pokorski, 1992). As the numbers and roles of women in the military expand, it is of critical importance to reduce their smoking prevalence and the smoking-related adverse effects on readiness, personal health, medical care costs, and the health of their children.

There have been reductions in military smoking rates in recent years due at least in part to military health promotion efforts, yet increased support for cessation is needed to further reduce smoking rates (Pokorski, 1992). Cessation is a complex behavioral problem for smokers, most of whom experience substantial difficulty quitting (Fiore et al., 1989). In general, however, smokers prefer to quit without intensive intervention. Convenient information and support in the form of telephone hotlines and mailed self-help materials have been shown to be effective (Gruder, Mermelstein, Kirkendol, et al. 1993; Ossip-Klein, Giovino, Megahed, et al. 1991). The issue of cessation is complicated, however, by the fact that women and men may have different cessation experiences. For example, women and men are similar in terms of their intentions to quit and their number of quit attempts, yet women are less likely to succeed in their cessation efforts (Kabat & Wynder, 1987; USDHHS, 1979; Gritz & Jarvik, 1978). Black women in particular have a low propensity to quit (Geronimus, Neider & Bound, 1993). Theoretical and empirically-based explanations for this finding point to gender differences in the following: severity of withdrawal symptoms (Guilford, 1967), confidence and self-efficacy for quitting (Blake, Klepp, Pechacek, et al., 1989), perceived social/psychological benefits of smoking (e.g., stress reduction) (Lacey, Manfredi, Balch, et al. 1993; Grunberg, Winders & Wewers, 1991), media and social influences to smoke (Grunberg, Winders & Wewers, 1991; Ernster, 1985; Howe, 1983), cognitive and emotional reactions to cessation lapses (O'Connell, 1990; Blake, Klepp, Pechacek, et al., 1989), normative biases regarding smoking prevalence (Lacey, Manfredi, Balch, et al., 1993), cessation coping strategies (Sorensen & Pechacek, 1987), occupational status and perceived control at work (Hibbard, 1993), knowledge and concern about the health risks of smoking (Sorensen & Pechacek, 1987; Ernster, 1985) and biological sensitivity to nicotine (Perkins, 1996; Grunberg, Winders & Wewers, 1991).

During cessation attempts, women may rely on informal sources of social support more than men do (Sorensen & Pechacek, 1987.) In addition, studies consistently report that women fear cessation-induced weight gain, and that this concern may contribute to relatively higher relapse among women (Marcus, Albrecht, Niaura, et al. 1991; Perkins, Epstein, & Paster, 1990.) Weight gain may be particularly worrisome for women in the military because their fitness level and weight are routinely tested, and unacceptable levels are grounds for discharge (OPNAVINST 6110.1D, 1990). The findings above suggest that smoking cessation interventions should be gender-specific, and that effective cessation programs should include convenient social support and weight management strategies (e.g., focus on exercise and nutrition) (Marcus, Albrecht, Niaura, et al., 1991; Sorensen & Pechacek, 1987.)

Comprehensive DoD and service-specific policies have been implemented that address the prevention and reduction of smoking by mandating smoke-free work places and cessation support for military personnel (DoD, 1994; SECNAVINST, 1986). The US Navy, for example, prohibits tobacco use during recruit training for the entire eight-week duration of basic training. A recent study by two of the this study's investigators found a meaningful impact of the Navy's

no-smoking policy on the smoking behavior of male recruits at graduation from basic training (40% self-reported quit rate) (Hurtado & Conway, 1996). However, because the 1-year quit rate indicated substantial relapse, the authors recommended cessation education and skills training to help new Navy personnel maintain long-term cessation. An unpublished study by the same investigators of male and female enlisted recruits found that the short-term positive effects of the smoking ban during basic training was more dramatic for women smokers than for men (i.e., a 43% reduction in smoking prevalence for women versus 15% reduction for men). However, women also showed greater relapse at the one-year follow-up (67% increase in smoking for women versus 38% increase for men).

C. Purpose of Present Work

The primary purpose of this study is to test an innovative approach aimed at reducing tobacco use among Navy women. The study, entitled Operation Stay Quit (OSQ), is designed to implement and evaluate two relatively "nonobtrusive" (i.e., telephone helpline and mail) relapse-prevention strategies supporting maintenance of the organizationally-enforced "quit status" achieved by all recruits during their basic training. In addition to a standard-treatment control group, one intervention group is encouraged to access a toll-free, telephone helpline for support and counseling to remain a nonsmoker or to quit again if they have relapsed into smoking; the other intervention group receives a series of monthly mailings to support and encourage nonsmoking during their first year of naval service.

1. Hypotheses

The investigators' primary hypotheses regarding the smoking rates of Navy women during their first year of service are the following:

- (a) The prevalence of self-reported smoking among women recruits at entry into the Navy will decline significantly by the end of basic training as a result of exposure to the mandatory no-smoking policy and standard tobacco use education received during recruit training. This result has been observed previously in men recruits (Hurtado & Conway, 1996). And, based on a small sample of unpublished data on women by these investigators the percentage change from self-reported smokers to nonsmokers by the end of training is expected to be greater in women than previously reported for men.
- (b) The relative percentages of former smokers who *relapse into smoking* after leaving the Recruit Training Command will be ordered as follows:
 - (i) lowest relapse rate in the women assigned to the condition with access to and encouragement to use the telephone helpline,
 - (ii) intermediate relapse rate in the women assigned to the intervention condition receiving regular mail support, and
 - (iii) highest relapse rate in the standard-treatment group of women who receive no intervention supporting maintenance of smoking cessation after graduating from

recruit training. It is hypothesized that the telephone helpline group will have lower relapse rates than the mail-support group for several reasons. Although everyone in the mail-support group will receive intervention materials, this approach is a *passive* strategy and is, therefore, expected to have a lower impact than the *active* strategy involved in the telephone helpline approach. Also, whereas only a subset of individuals in the helpline group will actually use the phone service, it is expected that this intervention strategy will be very effective for those who do call. In addition, incentives will be offered to encourage use of the helpline.

- (c) "Stage-of-change" patterns of cessation and relapse curves are expected to be different across the groups based on comparisons of the 3-, 6-, and 12-month measures of smoking status after leaving recruit training. The steepest relapse curve post-RTC is expected in the standard-treatment control group. The flattest relapse curve is expected in the group who receives the telephone counseling.
- (d) Considering only the intervention group with access to the telephone helpline after leaving the RTC, women who call the telephone helpline will have a lower smoking relapse rate at the 12-month follow-up than will women who do not use the helpline.

2. Technical Objectives

The specific questions to be addressed by the primary technical objectives of this project are as follows:

- (a) After exposure to the RTC's 24-hour-per-day no-smoking policy (i.e., mandatory "cold turkey" cessation for eight weeks) do a significant number of women who smoked when they entered the Navy modify their self-concept as smokers and report that they are *former* smokers at the end of recruit training?
- (b) What percent of women smokers relapse into smoking again after having spent an 8-week period of mandatory cessation? Does this percentage vary by demographic subgroups (e.g., age, education, ethnicity), by psychosocial predictors (e.g., "stage of change" for smoking cessation), or by Navy environmental factors (e.g., ship versus shore command, deployment status, job rating, type of technical training)?
- (c) Are the two cessation-support interventions tested in this study more effective than the Navy's "standard treatment" in preventing smoking relapse after leaving recruit training? What is the relative effectiveness of the telephone helpline support compared to the mailed support in preventing smoking relapse?

II. Body

A. Methods

1. Study Setting

All Navy recruits - women and men - receive their basic training at the Recruit Training Command (RTC), Great Lakes, Illinois. The RTC was the setting for recruitment into the study, as well as baseline and graduation assessments of smoking status. All recruits go through an 8-week basic training program as their introduction to the Navy. A 24-hour-per-day ban on smoking is in place for the entire eight weeks of training. Following completion of recruit training, Navy personnel are stationed at commands throughout the world. Intervention materials and surveys were mailed to participants at their current duty station.

2. Participants

Study participants consisted of volunteers from among all female recruits entering the Navy between March 1996 and March 1997 (approximately 12 consecutive months). A recruitment period of approximately one year was chosen due to the seasonal variation in the characteristics of recruits. The 1997 annual report provides a detailed description of the participant sample.

3. Design

The research was a longitudinal field experiment in which women recruits were randomly assigned to one of three conditions and were followed over five repeated assessments. All women recruits were approached during processing week (P-week) regarding participation in the study. After being given a description of the study, they were asked to give voluntary consent to participate and complete a baseline survey. Just prior to graduation, these recruits were asked to complete a graduation survey to ascertain changes in self-concepts regarding smoking status. All recruits who described themselves as smokers on the baseline survey comprised the follow-up study group, which was assessed three additional times over the course of one year post-RTC training.

The three study conditions were:

- (a) **control** - standard recruit training information and no other treatment (RT-only),
- (b) **telephone** - standard recruit training plus access post-RTC to a toll-free telephone helpline to support relapse prevention or support for quitting again (RT + phone), and
- (c) **mail** - standard recruit training plus a series of post-RTC regular mailings with incentive items to support relapse prevention and encourage quit attempts (RT + mail).

Because all recruit training activities are conducted as divisions of approximately 80 women, random assignment to condition was made by division rather than individual. Thus, divisions were randomly assigned to one of the three study conditions: (a) RT-only, (b) RT + phone, and (c) RT + mail. Although the unit of randomization was division, the unit for all analyses was the individual. This was appropriate because individuals were essentially randomly assigned to divisions (i.e., in the order they arrived at recruit training).

Smoking relapse typically occurs relatively soon after a quit attempt, therefore, several assessments of smoking status were made during the first year post-RTC. It has been estimated that approximately 70% of people relapse within three months of a cessation attempt, with an additional 10-15% relapsing between 3 and 12 months (O'Connell, 1990). Thus, participants were sent a follow-up smoking status survey at 3-, 6-, and 12-months after graduating from recruit training.

4. Follow-up Tracking Procedures

The study used several Navy data sources to locate and track study participants after graduation from RTC. For the purpose of conducting the 3-month post-graduation smoking survey, the orders-disseminating computer system maintained by Source Data Systems (SDS) at Navy Bureau of Personnel (BUPERS) provided the basis for tracking participating recruits immediately after graduating from recruit training. SDS electronically sent OSQ staff a weekly file of all women recruits receiving orders that week for their post-graduation assignment. SDS files were found to furnish reliable information about a recruit's whereabouts up to three months post-graduation. In cases where participants had graduated from RTC but did not appear in SDS files, the Navy's standard personnel file, the Enlisted Master Record (EMR), was checked to determine the status of the participant. The EMR resides on the Naval Health Research Center (NHRC) VAX computer, and was accessed electronically each month and information downloaded to the OSQ main computer. Information about a recruit's present and future command location, along with demographic data, was extracted from the 390-character EMR. In addition, the EMR contained "loss dates" that were used to identify Navy drop-outs/attriters. As a last resort, a hired staff person on-site at RTC could access other specialized Navy databases (i.e., Navy locator file, RTC databases) to identify location and status of a given participant. All of these data sources, except SDS, were used to track participants for the 6- and 12-month surveys as well. No fewer than two attempts were made to deliver the surveys to "smokers" using a combination of these sources of information.

5. Survey Procedures

Entry Survey Procedures. On P-4 day (i.e., fourth day of processing in the training cycle), all female recruits went through the "Wellness Clinic." At this time women received a gynecological exam and were given information in lecture format on several areas of health promotion, including pregnancy and birth control, sexually-transmitted

diseases, and substance abuse (including drugs, alcohol, and tobacco). Prior to being given any health information, the OSQ study was introduced and informed consent procedures were systematically conducted using a 10-minute videotaped presentation. Recruits who volunteered to participate in the study were asked to complete a brief one-page "Entry Survey" related to their tobacco use *prior* to entering the Navy.

Graduation Survey Procedures. During the week prior to graduation from recruit training (typically on Week 7-3 day), recruits attended a "Recruit Critique" session during which they provided anonymous feedback by questionnaire and written comments regarding their training. After completing their feedback, any male recruits (if present) were dismissed to muster outside while female recruits remained approximately 15 minutes longer. During this time an OSQ staff member reminded recruits about the study and asked volunteers to complete a brief one-page "Graduation Survey". The "Grad Survey" asked several questions about tobacco use that were similar to the those on the "Entry Survey" (e.g., description of self as a smoker or nonsmoker, intentions to smoke) so that changes during the 8-week period of mandatory smoking cessation could be assessed.

Follow-up Survey Procedures. All female recruits who reported on the Entry Survey that they had *any experience with smoking* (referred to in the present report as "smokers") comprised the post-RTC follow-up study group. These "smokers" included those who identified themselves as daily smokers, occasional smokers, experimenters, or former smokers. The rationale for the inclusive, liberal definition of "smokers" was based on previous studies of Navy personnel that suggest some new service members may take up the habit once joining the Navy, or may relapse if they had been a former smoker (e.g., Cronan, Conway, & Kaszas, 1991; Bray et al., 1991). It was believed that former smokers at entry, and those who had even experimented with smoking, might be at risk for becoming regular smokers once joining the Navy. Thus, daily smokers as well as those that occasionally smoked, experimented with smoking, and former smokers were targeted for post-RTC intervention and follow-up.

After graduating from recruit training, these "smokers" were sent a 3-month, 6-month, and 12-month follow-up survey. The content of the three surveys was identical, but the surveys were color-coded to indicate the assessment time point. Follow-up measures primarily addressed smoking status and quit attempts. Many items on the follow-up surveys included the reference point "since graduating from recruit training" so that patterns of relapse and quitting could be determined.

A number of strategies were used to maximize the response rates to the follow-up surveys. With each initial mailing of a survey, a monetary incentive (i.e., a chance to win \$100.00) was offered for returning the completed survey. The next week a postcard was sent reminding participants to return their survey for a chance to win the \$100.00. If a survey was not returned within two weeks after the initial mailing, trained phone surveyors attempted to contact the nonrespondent by telephone to conduct an abbreviated version of the survey. Phone surveyors were given two more weeks to contact and

complete any given survey. Finally six weeks after mailing the original survey, a brief postage-paid "postcard" version of the survey with a few critical items was mailed to nonrespondents. Once again, a chance at winning \$100.00 was offered for completing the "postcard" survey.

For the 12-month follow-up survey, a number of additional procedures were implemented to increase the response rate to this final survey. With the first mailing of the 12-month survey, participants are offered a free pre-paid phone card valid for 10 minutes of long distance phone calls in addition to entering the \$100.00 lottery if they complete and return the survey. Those who did not return the survey from the first mailing were contacted by phone, as detailed above. Following the phone survey attempts, those who still had not responded were sent a second 12-month survey with an offer of \$20.00 cash for completing and returning the survey. Participants who did not respond to any of these survey attempts were sent a postage-paid, brief survey postcard. Lastly, nonrespondents were mailed a postcard asking them to call one of two phone numbers *collect* to complete a survey and receive \$20.00.

6. Description of Interventions

Two intervention strategies were employed in this study. One intervention group was encouraged to call a toll-free telephone helpline for support and counseling on how to remain a nonsmoker or how to quit again if relapse had occurred after leaving the RTC. This was considered an *active* intervention in that it was initiated by the participant. The second intervention group received a series of regular motivational mailings to support and encourage nonsmoking during the first year of naval service. This was considered a *passive* intervention in that no action was required by the participant to receive this information.

Both relapse-prevention interventions used a cognitive-behavioral approach that assumes behavioral changes such as quitting smoking are primarily due to self-regulation and motivation (Marlatt & Gordon, 1985; Baumeister, Heatherton & Tice, 1994). These interventions addressed issues specific to women and cessation, and were based on empirical findings on gender differences in smoking cessation (Gritz, Brooks & Nielsen, 1995). Finally, both interventions were designed to address issues relevant to Navy life and utilize strategies for quitting and remaining smokefree that were Navy-specific.

Mail Intervention Materials Development and Procedures. Subjects assigned to the mail intervention condition received a series of six mailings beginning one month post-graduation and continuing for a period of 10 months. The mailings consisted of a colorful, one-page motivational flyer accompanied by a small "behavioral cue" item. The intervention modules were mailed out once per month for the first four months post-RTC, then every three months for the remainder of the 10-month period. Copies of the mail support intervention modules can be found in Appendix A.

Phone Intervention and Procedures. The telephone helpline represented an innovative approach to smoking relapse prevention. Women assigned to this condition received information regarding the 1-888-helpline services prior to leaving recruit training, and were encouraged to call the number upon leaving recruit training. Incentives such as a pre-paid long distance phone card were offered to encourage phone calls. Once the participant made the initial call, the helpline counselor would schedule a series of follow-up phone calls, thus creating a proactive counseling procedure. This procedure created a certain level of accountability, as well as fostering social support. The follow-up sessions were scheduled in relation to the participant's probability of relapse, thereby providing assistance when they need it most (Zhu & Pierce, 1995).

The counseling protocol was adapted to reflect the relapse issues most relevant to Navy women, as discussed above. In particular, the phone counselor would help the caller identify situations in which she felt most likely to relapse, and then work with her to identify responses/alternative actions to take to reduce the likelihood of relapse. In subsequent phone calls, the counselor would discuss any relapse episodes and works with the caller to identify better ways to respond in situations that prompt smoking. Alternatively, if the caller had remained quit, subsequent phone calls were used to encourage the success and identify long-term strategies for remaining quit.

7. Measures

All Surveys. Primary measures for evaluating intervention effects included self-report survey measures of smoking status, smoking frequency and amount, quit attempts, and stage of change for cessation. Investigators from SDSU, UCSD, and NHRC developed smoking measures for this unique population in part based upon those used by other researchers examining smoking and cessation among Navy and civilian personnel (Bray, Marsden, & Peterson, 1991; Bray, Kroutil, Wheelless et al., 1995; Hurtado & Conway, 1996; Conway, Trent, & Conway, 1989; Farkas, Pierce, Zhu, Rosbrook, Gilpin & Berry, 1996). Where possible, comparability with other surveys, such as the DoD worldwide survey of drug use (Bray et al., 1995) and the California statewide tobacco use survey (Pierce et al., 1994), was maintained.

Three brief, color-coded machine-scannable surveys were developed to assess smoking at five different points: RTC entry, RTC graduation, 3-month, 6-month, and 12-month post-graduation. The entry survey included the consent form, and all the surveys included some personal identifiers, items addressing cigarette use, and other correlates of smoking. In addition, questions about quit and intentions to smoke in the future were included (see Appendix B for copies of all surveys).

UCSD Data Collection. The counseling protocol was developed by UCSD telephone counselors for subjects in the helpline condition. Data collected during the call included background and identifying information, smoking status, self-efficacy and motivation to quit smoking, quitting history, reasons to quit smoking, social support and social influences to smoke and quit, and general health status (e.g., pregnancy). In addition,

quantitative data were collected about situations the subject had encountered (or anticipated encountering) that might lead to relapse.

EMR Demographics. As mentioned above, the EMR provided important variables for tracking research participants over the course of the study. Tracking variables included current, previous, and future UICs (i.e., commands), dates of transfer to and from UICs, loss codes, sea versus shore status, and regular versus reserve status. In addition to tracking variables, the EMR also provided sociodemographic and command-related information that could be examined as mediators and moderators of intervention effects. These potential mediators and moderators included age (i.e., birthdate), race/ethnic group, rating, paygrade, Navy enlisted classification (NEC), years of education, marital status, number of children, Navy performance and evaluation information, and command size.

8. Analyses

Analyses have included descriptive procedures, such as frequency distributions and chi-square analyses of categorical variables. These analyses have been conducted to determine participation rates and examine entry-smoking rates of incoming recruits. Chi-square analyses have been conducted to assess correlates of smoking at entry. Tests for differences in proportions have been used to compare recruit and civilian smoking rates. Analyses of entry-to-graduation changes in perceptions of being a smoker and intentions to smoke have included McNemar tests for correlated proportions and paired t-tests. Assessment of intervention results at the 3-, 6-, and 12-month follow-ups have been conducted using various analyses, including chi-square tests for selected comparisons as well as multivariate analyses using generalized linear model procedures for repeated measures (e.g., SAS's *mixed linear model* and *GEE* procedures), depending on the type of dependent variable being examined (e.g., binary vs. normally distributed).

B. Results

1. Participation in Intervention and Assessment

Between March 1996 and March 1997, 5,503 women within 87 divisions provided consent and completed entry surveys—93% of those eligible based on counts of recruits provided by RTC rosters. Refusals to provide consent and complete the entry survey were virtually nonexistent, and most of the 7% of women not completing surveys failed to because of scheduling changes that resulted in their not attending the Wellness Clinic with their division. Near the time of graduation, 4,411 women completed graduation surveys. Of those who completed entry surveys, 350 women were discharged from the Navy before graduating from recruit training. As these women were ineligible to complete graduation surveys, the response rate for the graduation survey was 86%. Again, virtually all of the 14% not completing a graduation survey failed to do so because they were completing other tasks and were not with their division.

All participants who reported having any smoking experience at entry to recruit training were targeted for follow-up at 3, 6, and 12-months after leaving recruit training. The 3-month follow-up data collection was completed in late summer, 1997. The final response rate to the 3-month follow-up survey was 39%. A manuscript that describes the process and results of efforts to enhance response rates to the 3-month survey has been published in *Evaluation Review* (see Appendix ?X?).

The 6-month follow-up was completed in December, 1997. Of the 2,384 participants thought to be eligible for surveying, 41.4% (n=988) returned a 6-month survey. The 12-month follow-up data collection was extended through the end of August 1998. This extended data collection period was made possible through implementation of a no-cost extension undertaken to increase the response rate to the final survey. Intensive efforts to maximize response rates have been summarized in a manuscript currently under review (see Appendix ?X?). Of the 2,384 participants thought to be eligible for surveying, 51.5% (n=1,227 ?XX? xxx) returned a 12-month survey date.

2. Extent of Intervention Delivery

Mail Support. As of March, 1998, all six modules of the mail intervention had been mailed to participants assigned to that experimental condition (approximately 1,000). When needed, two attempts were made to deliver successfully all intervention mailings, and the outcome of attempts was recorded (i.e., delivered at first attempt, delivered at second attempt, not deliverable). The rate of undeliverable mail was low, approximately 3%.

Telephone Helpline. In June, 1998, the helpline support intervention ended. As of that date, 29 participants had contacted the 1-888 telephone helpline. Out of these, only 5 completed the full counseling protocol.

3. Smoking and Cessation Experiences at Entry to Recruit Training

Table 1 presents information about smoking at entry to recruit training for all women recruits. Nearly 42% of the 5,503 women recruits reported having smoked 100 cigarettes in their entire life. When asked to describe themselves *prior to recruit training* according to five smoking categories, 45% reported having never smoked, 29% reported they were daily smokers, 12% reported they were occasional smokers, 11% reported they were experimenters, and 3% categorized themselves as former smokers. Thus, 55% were "smokers" who had some experience with smoking prior to RTC. The average age (median) of beginning fairly regular use was 16 years. Slightly over one-fourth of all recruits (48% of smokers) reported smoking as recently as the day they arrived at recruit training. Overall, 40.6% reported smoking *within 29 days* prior to RT. Among smokers, 66% reported smoking everyday prior to entering RTC, and 34% reported smoking only some days. The item assessing the quantity of cigarettes smoked during the 30 days prior to RTC showed that women smoked an average of 6-10 cigarettes (median category) on typical days that they smoked; about 20% smoked half a pack or more on typical days

that they smoked. The quantitative smoking item was recoded to compute a baseline 30-day smoking prevalence, and analysis showed that 42.5% of recruits (n=2,337) reported any smoking in the past 30 days. Prior to entering RTC, 10% of smokers had their first cigarette of the day immediately upon waking, although a full 30% did not smoke until more than two hours after waking. Almost 45% of those answering this question as a smoker reported typically having their first cigarette of the day within 30 minutes after waking.

Table 2 presents frequency distributions of items assessing the smoking cessation history of women entering the Navy. Approximately 65% of those who had smoked reported having ever tried to quit, and over half of these had tried within the three months prior to entering recruit training. The last quit attempt among those who had tried within the past 12 months lasted an average (median) of 8-29 days, although 44% relapsed within seven days. The longest average (median) quit attempt was 1-3 months in duration. Those attempting to quit for a day or longer within the past 12 months reported having made, on average (median), two attempts, although 20% had made five or more attempts within that timeframe.

TABLE 1

Smoking History of Navy Women Recruits upon Entry to RTC (1996-1997)

Item	n	% of total	% excluding NA
Have you smoked 100 cigarettes (5 packs) in your entire life?			
No	3201	58.3	---
Yes	2289	41.7	---
How would you describe yourself <u>prior to recruit training</u> ?			
Never Smoked	2467	44.8	---
Experimented with smoking	624	11.3	---
Occasional Smoker	644	11.7	---
Daily Smoker	1586	28.8	---
Former Smoker	182	3.3	---
At what age did you first start smoking <u>fairly regularly</u> ?			
NA - have never smoked regularly	3149	57.4	---
Under 12 years	81	1.5	3.5
12	138	2.5	5.9
13	182	3.3	7.8
14	251	4.6	10.7
15	340	6.2	14.5
16	489	8.9	20.9
17	345	6.3	14.8
18	282	5.1	12.1
19	104	1.9	4.4
20	57	1.0	2.4
21 years or older	69	1.3	3.0
When was the <u>last time</u> you smoked a cigarette?			
NA - have never smoked regularly	2499	45.5	---
Day arrived at recruit training	1430	26.0	47.7
1-7 days before recruit training	599	10.9	20.0
8-29 days before recruit training	202	3.7	6.7
1-3 months ago	189	3.4	6.3
4-6 months ago	115	2.1	3.8
7-11 months ago	108	2.0	3.6
1-4 years ago	229	4.2	7.6
5 or more years ago	126	2.3	4.2

TABLE 1 (cont...)

Smoking History of Navy Women Recruits upon Entry to RTC (1996-1997)

Item	n	% of total	% excluding NA
<u>Prior to recruit training</u> , did you smoke cigarettes every day or some days?			
NA - did not smoke prior to recruit training	2999	54.9	---
Every day	1628	29.8	66.0
Some days	837	15.3	34.0
During the <u>30 days prior to recruit training</u> , how many cigarettes did you smoke on a <u>typical day</u> when you smoked cigarettes?			
NA - did not smoke any cigarettes in the last 30 days	3157	57.5	---
Less than 1 cigarette on average	309	5.6	13.2
1-5 cigarettes	523	9.5	22.4
6-10	394	7.2	16.9
11-15	299	5.4	12.8
16-20	417	7.6	17.8
21-25	169	3.1	7.2
26-30	104	1.9	4.5
31-35	38	.7	1.6
36-40	49	.9	2.1
More than 40 cigarettes	35	.6	1.5
Past 30-day smoking prevalence	5494	42.5	---
During the <u>30 days prior to recruit training</u> , how soon after waking up would you usually smoke your first cigarette?			
NA - did not smoke prior to recruit training	3221	58.7	---
Immediately after waking up	227	4.1	10.0
Withing 15 minutes after waking up	436	8.0	19.3
15-30 minutes after waking up	347	6.3	15.3
31-60 minutes after waking up	297	5.4	13.1
61 minutes - 2 hours after waking up	277	5.1	12.2
More than 2 hours after waking up	678	12.4	30.0

TABLE 2

Smoking Cessation History of Navy Women Recruits upon Entry to RTC (1996-1997)

Item	n	% of total	% excluding NA
Before recruit training, had you ever tried to quit smoking?			
NA - have never smoked	2797	51.5	---
No	917	16.9	34.8
Yes	1718	31.6	65.2
Before recruit training, when was the <u>last time</u> you tried to quit smoking?			
NA- have never smoked	2798	51.0	---
Have never tried to quit	874	15.9	---
1-7 days before recruit training	161	2.9	8.9
8-29 days before recruit training	317	5.8	17.4
1-3 months before recruit training	451	8.2	24.8
4-6 months before recruit training	241	4.4	13.2
7-11 months before recruit training	188	3.4	10.3
1-4 years before recruit training	375	6.8	20.6
5 or more years before recruit training	86	1.6	4.7
Considering the <u>last time</u> you tried to quit smoking during the past 12 months, how <u>long</u> did you stay quit? (Do not count recruit training.)			
NA - did not smoke in the past 12 months	2940	53.6	---
Did not try to quit in the past 12 months	907	16.5	---
Less than 24 hours	123	2.2	7.5
1 day	113	2.1	6.9
2-7 days	494	9.0	30.1
8-29 days	301	5.5	18.3
1-3 months	269	4.9	16.4
4-6 months	135	2.5	8.2
7-11 months	101	1.8	6.2
1 year or more	106	1.9	6.5

TABLE 2 (cont...)

Smoking Cessation History of Navy Women Recruits upon Entry to RTC (1996-1997)

Item	n	% of total	% excluding NA
Not counting recruit training, what was the <u>longest time</u> you have ever quit smoking?			
NA - have never smoked	2783	50.7	---
Have never tried to quit	726	13.2	---
Less than 24 hours	70	1.3	3.5
1 day	74	1.3	3.7
2-7 days	402	7.3	20.3
8-29 days	283	5.2	14.3
1-3 months	333	6.1	16.8
4-6 months	201	3.7	10.1
7-11 months	168	3.1	8.5
1 year or more	452	8.2	22.8
Not counting recruit training, <u>how many times</u> have you tried to quit smoking for <u>one day or longer</u> during the <u>past 12 months</u> ?			
NA - did not smoke in the past 12 months	2981	54.5	---
Did not try to quit in the last 12 months	948	17.3	---
Never quit for a whole day	60	1.1	3.9
Once	420	7.7	27.3
Twice	371	6.8	24.1
Three times	276	5.0	1.8
Four times	97	1.8	6.3
Five or more times	313	5.7	20.4

4. Agreement among Entry Smoking Items regarding Status as a Never Smoker

Of interest was the correspondence or agreement among various Entry survey items in classifying individuals as smokers or never smokers. Crosstabulations revealed that Entry survey smoking items showed very good agreement. For example, 99% of those reporting that the last time they had smoked was within 29 days before RTC were also categorized as smokers according the dichotomous recode of the quantitative item assessing the number of cigarettes smoked in the last 30 days prior to RTC. In particular, the agreement between self-identified type of smoker at entry to RTC with other entry smoking items was of interest, because those indicating they were "never smokers" on this item were excluded from the cohort of "smokers" followed post-RTC. Of the 2,464 individuals who identified themselves as never smokers on the type-of-smoker variable, 97% also reported having never smoked on the item assessing the last time one smoked. As an additional rigorous test of agreement regarding status as a never smoker, all items on the Entry survey that offered a "never smoked" response option were examined collectively. These five items included two smoking history items and three cessation history items. Analysis showed that 90% of all recruits (n=4,958) answered the five items consistently (i.e., either as a never smoker or as someone who had smoked sometime in her life). Ten percent (n=545) were inconsistent in their responses, classifying themselves as never smokers on one or more items, but not on all five.

5. Correlates of Smoking at Entry

Several sociodemographic variables were examined as possible correlates of smoking at entry to RTC, including age, education, race/ethnicity, and season of entry (see Table 3). Smoking prevalence was based on having smoked at all in the 30 days prior to entering RTC. Chi-square analyses showed that entry smoking rates varied significantly by age. Those women 19-23 years of age had the highest past-month smoking rate (45%); women 24 years and older had the lowest rate (34%). Close to half of the White/non-Hispanics (54%) and Native Americans (49%) reported smoking in the month prior to RT. Black women had considerably lower smoking rates (17%) relative to all other racial/ethnic groups. Education level was associated with smoking in a linear fashion, with those having less than a high school education reporting the highest rates. Recruits entering training in the summer, fall, and winter seasons had similar smoking rates (41%), although those entering in the spring months (March-May) reported a significantly higher prevalence (47%). This finding confirmed anecdotal reports of seasonal variations in the "quality" of recruits, including variations in health behavior. However, most Navy informants predicted that summer recruits would have the lowest smoking rates in part because of their commitment to join the military immediately after graduating from high school, and that winter recruits would have the highest rate, because they may have been unable to secure employment after graduation and join the Navy after a while as a "last resort." In the present study, this expectation was not confirmed, and in fact, those recruits entering the Navy in the month of May showed the highest past-month smoking rate (48%).

It is likely that several of the sociodemographic correlates considered are themselves intercorrelated. For example, those with greater than a high school education are likely to be older. A logistic regression analysis was conducted to determine the independent association of the sociodemographic factors with smoking status at entry. As shown in Table 4, all four variables were significantly and independently related to smoking at entry. Women 19-23 years of age had higher smoking rates than 17-18 year olds, although the rate among the oldest age group (24 and older) was not significantly different from that of 17-18 years olds. Blacks, Hispanics, and Asian/Pacific Islanders had significantly lower rates than Whites, although Native Americans did not differ significantly from Whites. Relative to those with more than a high school education, the odds of smoking were 3.8 times greater among those with less than a high school education, and about twice as likely among those with only a high school education. Summer, fall, and winter recruits all had lower smoking rates than recruits entering the Navy during the spring months (March-May).

6. Comparison with Civilian Rates

To compare Navy recruits' smoking rates to civilians', civilian data were obtained from the 1992-1993 to the US Bureau of the Census' Current Population Survey Tobacco Use Supplement (CPS-TUS). The Current Population Survey (CPS) is a continuous monthly survey conducted by the Bureau of the Census for the purpose of collecting labor force indicators for the civilian noninstitutionalized population of individuals 15 years and older. Briefly, the CPS is a probability sample based on a stratified sampling scheme of clusters of four neighboring households (see Hansen, 1985 for more details of the CPS methodology). Sample design and methods of weighting CPS data are geared towards producing estimates for the entire U.S. In the present study, these basic weights were applied, as were supplement weights for non-response, developed according to a special algorithm by the Bureau of the Census.

The 40-item Tobacco Use Supplement to the CPS was developed by the National Cancer Institute (NCI) primarily to track progress and impact of the large-scale tobacco control project entitled ASSIST (American Stop Smoking Intervention Study for Cancer Prevention). The supplement was used for three months (September 1992, January 1993, and May 1993) to provide baseline estimates for ASSIST. For the present study, data from all three months were combined. Almost 63,000 unweighted cases were extracted from the CPU-TUS for women between the ages of 17 and 35 years to correspond to the age range of Navy recruits.

TABLE 3

Sociodemographic Correlates of Smoking in the Past 30 days among Navy WomenRecruits (1996-1997)

Correlate	n	% Smoking	χ^2
Age			
17-18	2250	40.6	25.66***
19-23	2757	45.4	
24-35	463	34.3	
Race/ethnicity			
White non-Hispanic	3165	54.2	530.18***
Black	1269	17.2	
Hispanic	669	36.8	
Asian/Pacific Islander	228	33.8	
Native American	130	49.2	
Education			
Less than high school	301	56.8	56.29***
High school	4658	43.0	
Greater than high school	513	30.4	
Season of Entry			
Spring (March-May)	1164	47.4	14.52**
Summer (June-Aug)	1689	41.3	
Fall (Sept-Nov)	1715	41.0	
Winter (Dec-Feb)	925	41.4	

** $p \leq .01$ *** $p \leq .001$

TABLE 4

Results of Logistic Regression Predicting Past 30-day Smoking among 5,459 NavyWomen Recruits (1996-1997)

Correlate	Adjusted OR	95% CI	p
Age			
17-18 ^a	-	-	
19-23	1.22	1.08, 1.39	.002
24 and older	.85	.67, 1.27	.199
Race/ethnicity			
White non-Hispanic ^a	-	-	
Black	.17	.14, .20	.000
Hispanic	.46	.40, .55	.000
Asian/Pacific Islander	.45	.34, .60	.000
Native American	.83	.58, 1.19	.312
Education			
Less than high school	3.79	2.74, 5.21	.000
High school	1.94	1.55, 2.42	.000
Greater than high school ^a	-	-	
Season of Entry			
Spring ^a	-	-	
Summer	.77	.65, .91	.002
Fall	.80	.68, .94	.007
Winter	.79	.69, .95	.014

^a Reference group

As shown in Table 5, demographic characteristics of Navy recruits and civilian women from the CPS-TUS within the same age range differed. While the majority of women coming into the Navy were younger than 24 years, the majority of civilian women were older than 24 years both in weighted and unweighted civilian samples. The mean age of Navy women was 19 years ($SD=2.75$), while the mean age of civilian women was 27 years ($SD=5.44$). Far more of the Navy recruits had a high school education, whereas a higher percentage of civilians had both less than high school and greater than high school education. The Navy recruit sample had a higher percentage of Black women and fewer White/non-Hispanics than did the civilian sample.

To compare the smoking prevalence of Navy recruits and civilians, a definition of current smokers was used that differs from that used in other sections of this study. The definition for these comparisons is the one that the CPS-TPS routinely uses, and the two items used to compute the rate were identical on the CPS-TUS and Navy surveys. In each sample, women reporting having smoked 100 cigarettes in their life and being an everyday or someday smoker were coded as current smokers.

Table 6 presents unstandardized rates of current smoking for Navy recruits and civilian women overall, and by age, education, and race/ethnicity. Unstandardized rates overall were 39% and 24% for Navy recruits and civilians, respectively. Unadjusted recruit rates exceeded those of civilians in every age and education category. Navy smoking rates were significantly higher than civilian rates among White/non-Hispanics, Hispanics, and Asian/Pacific Islanders. Navy recruits who were Native Americans also had higher rates than their civilian counterparts, although the difference was only marginally significant ($\text{Chi Square}=4.19$, $df=1$, $p=.04$). The one exception to the pattern was the higher smoking rate of civilian Blacks relative to Black Navy recruits.

TABLE 5

Sociodemographic Characteristics of Navy Women Recruits (1996-1997)and a Civilian Sample (1992-1993)

Sociodemographic Characteristic	% in Sample		
	Navy Recruits (n=5,503)	Civilian ^a Unweighted (n=62,832)	Civilian ^a Weighted (n=37,382,796)
Age			
17-18 years	41	9	8
19-23	50	23	24
24-35	9	68	68
Education			
Less than high school	6	17	18
High school	85	34	33
More than high school	9	49	49
Race/ethnicity			
White, non-Hispanic	58	74	72
Black	23	12	14
Hispanic	12	9	10
Asian/Pacific Islander	4	4	3
Native American	2	1	0.6

^a Civilian estimates based on the 1992-1993 Current Population Survey, Tobacco Use Supplement.

Note. Civilian weighted estimates have been weighted to represent the civilian noninstitutionalized population of the United States using CPS algorithms.

Because the sociodemographic composition of Navy recruit and civilian populations differ greatly (see Table 5), the direct comparisons in Table 6 may not provide a clear description of the extent of differences in smoking rates. One method for accounting for differences in the distribution of sociodemographic characteristics is to examine smoking rates that are age-education-race specific. Typically, sample sizes are not large enough to present rates at this level of specificity, but the present study provided enough Navy and civilian individuals to conduct such a comparison. Table 7 presents current smoking rates divided by education within age within race/ethnicity. For some age-education-race categories, Navy and civilian comparisons could not be made because the number of Navy women recruits was too small to compute a reliable rate. For example, not surprisingly there were few recruits with more than a high school education in the 17-18 year age range. In addition, there were too few Native American recruits in the various age and education levels to conduct comparisons. However, enough specific comparisons could be made to show a relatively consistent pattern in which Navy smoking rates were higher than civilian. Of the comparisons made, over 80% showed Navy rates to be higher than civilian, although all of these did not reach a high level of significance ($p < .001$). For the most part, recruit rates were higher than civilian rates in every age-education-race category with a few notable exceptions. Although recruits who were White, Hispanic, Asian/Pacific Islander, and Native American generally smoked more than their civilian counterparts in most age and education levels, Blacks showed a different pattern. Black Navy recruit smoking rates were less likely to be significantly higher than civilian rates, and rates among the oldest Black recruits (24-35 years) were consistently lower than their civilian counterparts (although not statistically significant).

Of interest were the unusually low estimates for civilians in the 17-18 age range. For example, among Whites 17-18 years of age with less than a high school education, the smoking rates is 16% compared to 54% among 19-23 years olds of the same education and racial/ethnic group. The smoking estimates for 17-18 year olds in the CPS is lower than estimates reported elsewhere (USDHHS, 1994), and suggest undersampling or a response bias for this age group.

TABLE 6

Unstandardized Prevalence of Current Smoking among Navy Women Recruits (1996-1997) and Civilians (1992-1993)

Sociodemographic Characteristic	% Current Smoker	
	Navy Recruits (n=5,479)	Civilian ^a Weighted (n=37,184,141)
Overall	39	24*
Age		
17-18	36	12*
19-23	42	21*
24-35	34	27*
Education		
Less than high school	56	30*
High school	39	32*
Greater than high school	29	17*
Race/Ethnicity		
White non-Hispanic	51	27*
Black	12	20*
Hispanic	30	12*
Asian/Pacific Islander	32	7*
Native American	46	37

^a Civilian estimates based on the 1992-1993 Current Population Survey, Tobacco Use Supplement. Civilian estimates have been weighted to represent the civilian noninstitutionalized population of the United States using CPS algorithms.

* $p \leq .001$

TABLE 7

Current Smoking Rates among Navy Women Recruits (1996-1997) and Civilians^a (1992-1993) by Age, Education, and Race/ethnicity

Age/ Education	% Current Smoker									
	White Non-Hispanic		Black		Hispanic		Asian/ Pac. Islander		Native American	
	Navy	Civilian	Navy	Civilian	Navy	Civilian	Navy	Civilian	Navy	Civilian
17-18 years										
Less than HS	75	16*	13	04	43	05*	--	08	--	13
High School	48	19*	09	04*	28	07*	33	20	48	14*
Greater than HS	--	12	--	03	--	00	--	00	--	00
19-23 years										
Less than HS	73	54*	36	24	46	12*	--	09	--	39
High School	54	34*	14	11	32	11*	38	18*	47	35
Greater than HS	44	16*	05	06	21	07	11	05	--	10
24-35 years										
Less than HS	70	60	17	39	30	14	--	12	--	64
High School	52	38*	27	28	22	16	29	10	--	47
Greater than HS	34	19*	03	17	09	12	13	05	--	36
Unweighted \bar{n}	3169	46127	1273	7651	670	5800	228	2400	130	725

^a Civilian percents based on weighted frequencies from the 1992-1993 Current Population Survey, Tobacco Use Supplement. Civilian estimates have been weighted to represent the civilian noninstitutionalized population of the United States using CPS algorithms.

-- Navy \bar{n} s too low to conduct comparison

* $p \leq .001$

Another method for making comparisons between populations that differ with regard to sociodemographic characteristics is to use a direct standardization method to adjust for these differences so that meaningful comparisons can be made (Kalton, 1968). Such a procedure was used in the current study, similar to that previously used by Bray and colleagues in comparisons of Navy personnel and civilians on drug and alcohol use (Bray et al., 1995). The civilian and Navy recruit datasets were equated for age, with women between the ages of 17-35 included. Civilian data were standardized to the joint distribution of the Navy recruit sample in terms of education and race/ethnicity. Comparisons were made within three age strata: 17-18, 19-23, and 24-35 years.

With direct standardization, cells are formed by a complete cross-classification of the standardizing variables (Bray et al., 1995). In the present study, education (3 categories) and race/ethnicity (5 categories) were the standardizing variables. A complete cross-classification of these variables from the Navy recruit dataset produced 15 (5x3) cells.

Software for Survey Data Analysis, version 5.30 (SUDAAN, 1989) was used to produce estimates for the civilian data. SUDAAN was designed specifically for analysis of data from complex sample surveys and has the capability of calculating standard errors of proportions in accordance with the sampling design. SUDAAN's DESCRIPT procedure was used to produce standardized smoking prevalence estimates and standard errors. The weights produced from the Navy data by the cross-classification of education and race/ethnicity were applied to the civilian data using the DESCRIPT procedure. Estimates obtained for the civilian population by this method can be interpreted as the percentage that would be obtained if the civilian population had the same sociodemographic distribution as the Navy recruit population. Unstandardized estimates for the Navy sample were compared with standardized estimates for the civilian sample using a difference of proportions test.

Results of the standardized comparison of current smoking between Navy women recruits and civilian women, stratified by age, are presented in Table 8. After standardization, the overall prevalence of current smoking was significantly greater among Navy women recruits (38.7%) than among civilian women (28.8%). Standardized comparisons for women 17-18 years old and those 19-23 years old were statistically significant with Navy women recruits having higher rates of current smoking in both of these age strata. Navy women recruits who were 17-18 years old had over 2½ times the rate of current smoking than civilians, and women 19-23 had over 1½ times the rate of civilians. After standardization, rates of current smoking were not significantly different for Navy and civilians in the 24-35 age range.

TABLE 8

Comparison of Current Smoking Rates among Navy Women Recruits (1996-1997) and
Civilians (1992-1993)

Age	% Current Smokers (SE)		
	Navy Recruits	Civilian Unstandardized	Civilian Standardized ^a
Overall	38.7 (.66)	24.2 (.18)*	28.8 (.29)*
17-18	36.0 (1.01)	12.6 (.49)*	13.8 (.97)*
19-23	41.7 (.93)	21.1 (.37)*	24.8 (.57)*
24-35	33.5 (2.19)	26.7 (.23)*	32.0 (.36)

^a Estimates have been standardized to the Navy distribution of education and race/ethnicity.

* Significantly different from Navy estimate, $p \leq .001$

Note. \underline{n} of Navy recruit sample=5479; unweighted \underline{n} of civilian unstandardized sample=55172; unweighted \underline{n} of standardized civilian sample=55062.

7. *Effects of the Smoking Ban on Perceptions and Intentions at Graduation*

Statistical Power to Detect Changes. A primary analysis tested the hypothesis regarding the effectiveness of the eight-week smoking ban in changing women's perceptions of being a smoker. An a priori power calculation assumed a sample size of over 5,000 cases of which approximately 35% were expected to be smokers. The power calculation (using a .05 two-sided significance level) showed that the sample size would provide excellent power (.99) to detect a 43% change in the percent reporting they are smokers, the effect size reported in a previous unpublished study (Hurtado & Conway, 1991). In reality, 4,393 women provided entry and graduation data. A power calculation performed post hoc showed that this sample size also provided 99% power to detect a difference in paired proportions suggested by the Hurtado and Conway unpublished study. This large sample would provide sufficient power (.97) to detect changes in paired proportions even as small as 1%.

Entry-to-Graduation Changes in Perceptions of Being a Smoker. Among the 4,393 recruits who provided entry and graduation survey data on smoking, 41.4% ($n=1,819$) reported being smokers at entry (i.e., reported any smoking in the 30 days prior to RTC).² Slightly over 25% of the group ($n=1,110$) reported being a smoker at graduation, a statistically significant reduction of 39% (McNemar $\chi^2=665.7$, $p < .001$).

This change in perceptions of smoking status can better be interpreted by comparing it to changes that would have occurred without the 8-week ban on smoking. Prior to the implementation of the smoking ban during recruit training, Cronan, Conway, & Hervig (1989) conducted a study of the relative effectiveness of several smoking prevention/cessation interventions with male recruits at RTC, San Diego. Control group data from that study provide an estimate of "spontaneous" changes in smoking status that one could expect given no smoking ban. Smoking prevalence among this small group of 101 men at entry was 19% and at graduation was 26.7%, a statistically significant increase of 29% in the proportion of current smokers (McNemar exact test for correlated proportions, two-tailed, $p < .05$). Although the definition of smoking and the sex of the recruits differed in the present study and the Cronan et al. (1989) study, the differences in the direction and magnitude of change make a compelling case for the effect of the ban in changing perceptions of one's smoking status.

Figure 1 presents more specific information about how entry smokers viewed themselves at graduation. Approximately 60% of those reporting they had smoked in the 30 days prior to RTC reported they were still smokers at graduation; 37% considered themselves non/former smokers at graduation. A small percent (2.3%, $n=42$) of entry smokers reported at graduation that they had never smoked. Examination of other items for this small number of individuals showed that the majority of them were infrequent smokers at baseline (60% experimenters and 31% occasional smokers) and 74% reported smoking less than one cigarette on typical days when they smoked. In short, most of these

individuals were infrequent and very light smokers who, by graduation, considered themselves to be “never smokers.”

Figure 2 presents graduation smoking status by the type of entry smoker. In general, the more frequently the individual smoked before entering RTC, the less likely she was to consider herself a non-smoker by graduation. Among daily smokers at entry, 75% still classified themselves as smokers at graduation. The percentage of occasional smokers at entry who considered themselves smokers at graduation was 28%; only 3% of experimenters at entry saw themselves as smokers at graduation. Of particular interest, a full 20% of the small number of women reporting at entry that they were former smokers (n=128) considered themselves smokers by graduation. This interesting finding led to additional analyses to determine how long former smokers had been quit by the time they entered RTC. Over 88% of former smokers at entry who considered themselves smokers by graduation had smoked their last cigarette within a week of entering RTC, and therefore, had been off cigarettes only a short time. Finally, among those reporting at entry that they were never smokers, less than 1% considered themselves smokers at graduation.

Correlates of Changes in Perceptions of Being a Smoker. Several sociodemographic and baseline smoking variables were examined as correlates of changes in perceptions of being a smoker. Potential correlates included age, education, race/ethnicity, baseline intentions to smoke, and two measures of addiction (i.e., baseline smoking level, and when the first cigarette of the day is typically smoked). To examine correlates of changes in perceptions of being a smoker, four change groups were created, including: (1) those consistently (i.e., at entry and graduation) perceiving themselves as non-smokers, (2) those making a “negative” change, from non-smoker at entry to smoker at graduation, (3) those making a “positive” change, from smoker at entry to non-smoker at graduation, and (4) those consistently perceiving themselves to be smokers.

Among all participants, 58% (n=2,552) were consistent non-smokers, 0.5% (n=22) made a negative change, 17% made a positive change, and 25% consistently perceived themselves to be smokers. The group of women making a negative change from entry to graduation was very small, and therefore those 22 women were dropped as a group from the analysis of correlates.

Figure 1

Perceived Smoking Status at Graduation among Navy Women

Recruit Entry Smokers (1996-1997)

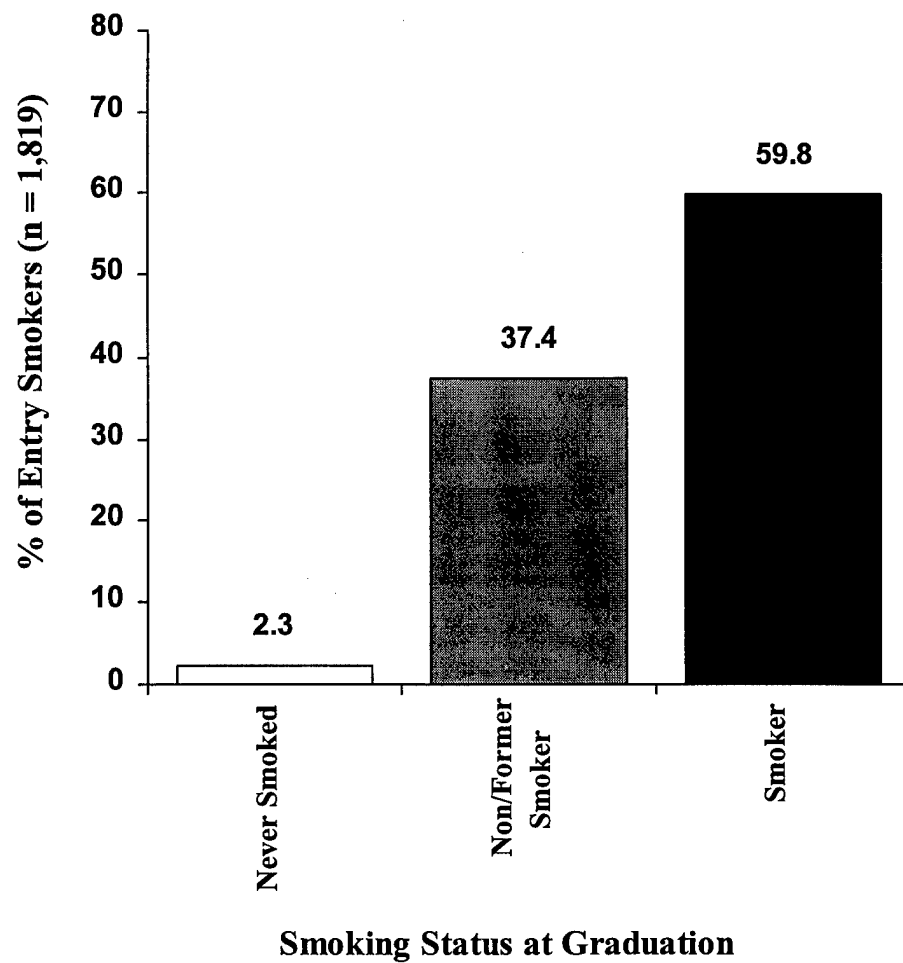
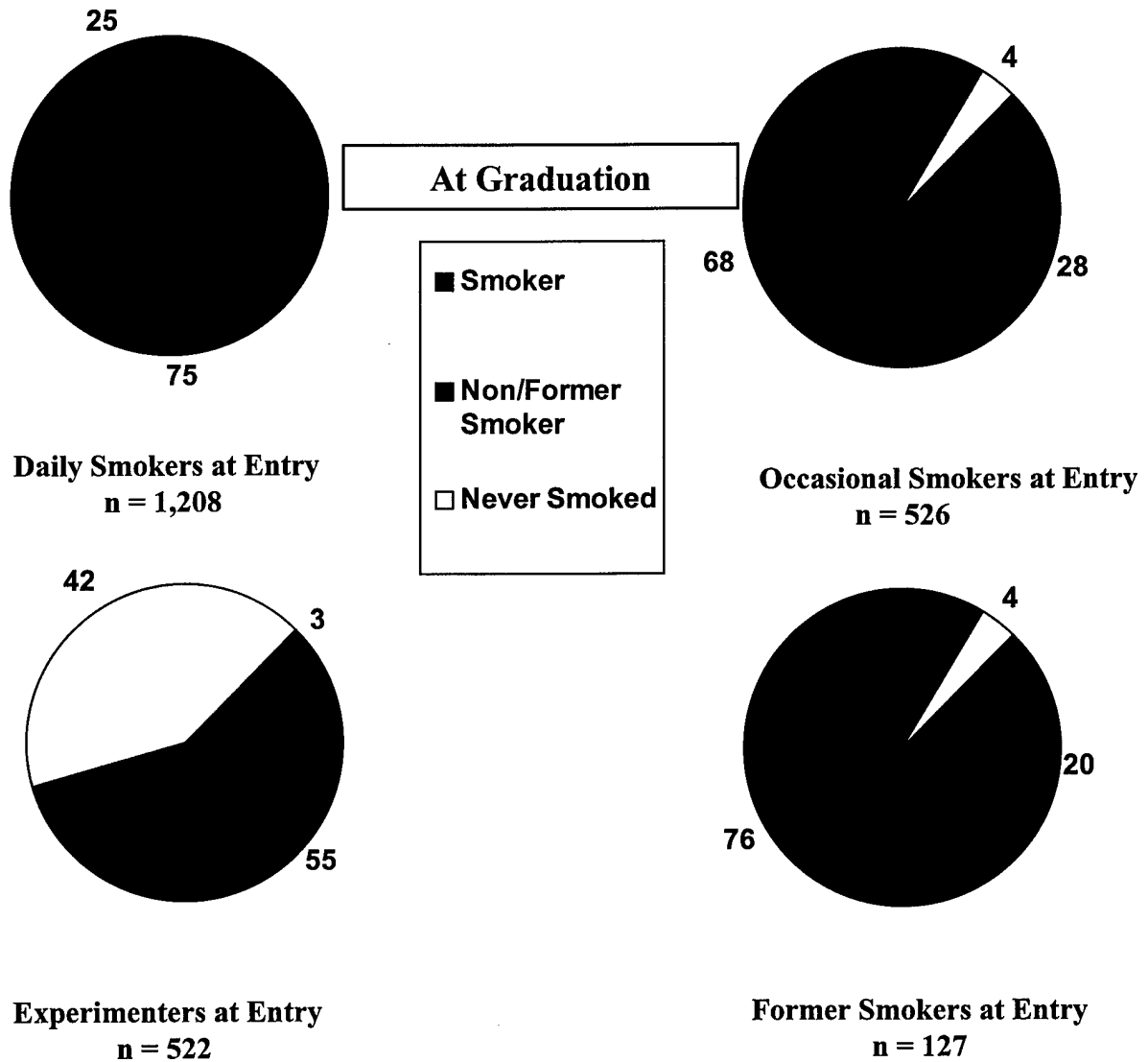


Figure 2

Perceived Smoking Status at Graduation among Navy Women

Recruits by Entry Smoking Type (1996-1997)



The analysis of correlates of changes in perceptions of being a smoker was limited to "smokers" who reported any experience with smoking prior to RTC . As shown in Table 9, there was a tendency for the oldest recruits (24-35 year age range) to be consistent in their perceptions of being a non-smoker, while recruits in the youngest (17-18) and middle age range (19-23) were disproportionately more likely to consistently perceive themselves as smokers. Education also was related to changes in perceptions of being a smoker. Almost half of both those with less than a high school education and those with a high school education reported consistently over time that they were smokers. Among those with greater than high school education, near equal percentages consistently reported being a non-smoker and a smoker. Making a positive change in one's perceptions was inversely related to education level, such that those with less education were more likely to make such as change than were those with more education.

Changes in perceptions of being a smoker were significantly different by race/ethnic group. White/non-Hispanics and Native Americans were more likely than Blacks, Hispanics, and Asian/Pacific Islanders to be consistent in their perceptions of being a smoker. Blacks were more likely than any other ethnic group to consistently report being a non-smoker. Percentages of participants making a positive change ranged from 29% (White/non-Hispanic) to 36% (Black).

As one would expect, entry-to-graduation changes in perceptions of being a smoker varied by level of addiction at entry to RTC. Compared to those making a positive change, those consistently reporting they were smokers consumed more cigarettes at baseline, and typically smoked their first cigarette of the day earlier. In addition, intentions to smoke measured at entry to RTC was related to change in perceptions of being a smoker. Those consistently seeing themselves as a non-smoker had relatively low intentions to smoke at baseline, followed by those making a positive change, and finally those consistently reporting they were smokers.

TABLE 9

Correlates of Changes in Perceptions of Being a Smoker among Navy Women Recruit Entry "Smokers"^a(1996-1997)

Correlate	% or Mean			χ^2 or F
	Consistent non-smoker (n=552)	Positive change (n=724)	Consistent smoker (n=1083)	
Age (%)				
17-18	24	32	44	
19-23	22	30	48	
24-35	34	30	36	16.07**
Education (%)				
Less than high school	15	36	48	
High school	23	31	46	
Greater than high school	36	25	39	22.62***
Race/ethnicity (%)				
White non-Hispanic	21	29	50	
Black	36	36	28	
Hispanic	29	34	37	
Asian/Pacific Islander	29	32	39	
Native American	20	30	50	62.95***
Cigarettes smoked per day during past 30 days (mean) ^b	--	2.73	4.29	278.08***
Minutes after waking have first cigarette during past 30 days (mean) ^c	--	4.74	3.51	221.96***
Intentions to smoke (mean)	1.19	1.92	2.70	788.06***

^a Included recruits with any smoking experience prior to entry.^b Scale includes 1 (less than 1 cigarette on average), 2 (1-5 cigarettes), 3 (6-10 cigarettes), 4 (11-15 cigarettes), 5 (16-20 cigarettes), 6 (21-25 cigarettes), 7 (26-30 cigarettes), 8 (31-35 cigarettes), 9 (36-40 cigarettes), and 10 (more than 40 cigarettes).^c Scale includes 1 (immediately after waking), 2 (within 15 minutes after waking), 3 (15-30 minutes after waking), 4 (31-60 minutes after waking), 5 (61 minutes-2 hours after waking), and 6 (more than 2 hours after waking).

-- By definition, consistent non-smokers had not smoked in the past 30 days upon entry to RTC.

** $p \leq .01$ *** $p \leq .001$

Entry-to-graduation Changes in Intentions to Smoke. Table 10 presents entry-to-graduation changes in intentions to smoke after leaving RTC for all participants, for “smokers” with any smoking experience at entry to RTC, and for past 30-day smokers at entry to RTC. Analyses showed an unexpected finding—the percent of Navy recruits reporting intentions not to smoke decreased slightly from entry to graduation. For example, the percent of those responding that they definitely did not intend to smoke decreased from 63% to 60%, and the percent responding that they definitely did intend to smoke increased from 4 to 7%. This unexpected finding also was reflected in increases in mean intention scores ($t(4363)=-10.62, p < .001$), where 1 indicates low intention and 4 indicates high intention to smoke. This finding was surprising because one might expect that, after almost eight weeks of cessation (albeit involuntary), the percent of women who intended not to smoke after leaving RTC would increase. The processes by which the RTC environment might positively influence smoking intentions were thought to include restrictions on the availability of cigarettes and cues to smoke, an opportunity to overcome physical addiction to nicotine, organizational non-smoking norms, and changes in self-perceptions and smoking attitudes.

Intention change among entry smokers was analyzed separately, with even more striking results. Among “smokers” (i.e., those with any smoking experience prior to entering RTC), there was a considerable shift in intentions to smoke, particularly in the percentages falling within the “probably no” and “probably yes” categories. Paired analyses showed that about 60% of “smokers” ($n=1,415$) were consistent at entry and graduation in terms of their placement in the four intention categories: 25% ($n=580$) answered “definitely no” at both times; 14% ($n=320$) answered “probably no” at both times; 17% ($n=408$) answered “probably yes” at both times; and 5% ($n=107$) answered “definitely yes” at both times. Forty percent of “smokers” moved across intention categories over the course of training: 13% ($n=311$) made positive changes (e.g., moving from “probably yes” to “probably no”), although 27% ($n=638$) made a negative change (e.g., moving from “probably no” to “probably yes”). Among past 30-day smokers, the shift was even greater, with even the percent definitely intending to smoke increasing 60% over the 8-week period.

TABLE 10

Changes in Intentions to Smoke among All Navy Women Recruits and among Smokers (1996-1997)

Item	% Responding					
	All Participants		"Smokers" ^a		Past 30-day Smokers	
	entry	grad	entry	grad	entry	grad
After leaving recruit training, do you intend to smoke?						
Definitely No	63	60	34	31	18	16
Probably No	18	15	31	25	36	27
Probably Yes	15	18	28	33	36	41
Definitely Yes	4	7	8	12	10	16
Mean (SD)	1.62(.90)	1.71(.98)*	2.10(.96)	2.26(1.03)*	2.38(.90)	2.57(.94)*

^a Reported any smoking experience at entry to RTC.* $p \leq .001$ Note. \bar{n} of all participants=4364; \bar{n} of "smokers"=2364; \bar{n} of past 30-day smokers=1804.

Table 11 continues the results by type of entry smoker. In general, more frequent smokers were more likely to report intentions to smoke at both entry and graduation, and were more likely to show "negative" changes in intentions over time. Among never smokers and experimenters, there was no statistically significant change in intentions. At both entry and graduation, the great majority of never smokers (95-95%) and experimenters (78%) definitely did not intend to smoke after leaving RTC. However, the pattern was different for daily, occasional, and former smokers. Eleven percent of daily smokers reported at baseline that they definitely did not intend to smoke after leaving RTC, and that percentage had decreased to 8% by graduation. A considerable number of daily smokers had shifted from the two "no" categories to the two "yes" categories over time. A third of the occasional smokers reported a definite intention not to smoke at baseline, a much larger percent than among daily smokers. However, similar to daily smokers, the percent of occasional smokers in the "no" categories decreased over time, and the percent in the "yes" categories increased. Of particular interest are the women who identified themselves at entry as Former Smokers. Although 73% of them definitely did not intend to smoke at baseline, only 59% of them reported that intention at graduation. In general, then, results showed that the overall increase in intentions to smoke after leaving RTC was primarily among the more regular and former smokers.

Additional analyses were conducted to explore the apparent discrepancy between changes in perceptions of being a smoker (i.e., a positive change overall) and changes in intentions to smoke (i.e., a negative change overall). Table 12 presents entry and graduation mean intention scores by changes in perceptions of being a smoker for those individuals with any smoking experience at entry to RTC. Those consistently perceiving themselves as non-smokers, those making a positive change in perceptions of being a smoker, and those making a negative change in perceptions of being a smoker made only small changes in intentions to smoke after leaving RTC. On the other hand, those perceiving themselves consistently as a smoker showed a large entry-to-graduation increase ($p < .001$) in intentions to smoke after leaving RTC. In summary, the apparent incongruity between overall changes in perceptions of being a smoker and intentions to smoke was primarily limited to those individuals who were consistent in their perception of themselves as smokers.

TABLE 11

Changes in Intentions to Smoke among Navy Women Recruits by Type of Entry Smoker (1996-1997)

Item	% Responding							
	<u>Daily</u>		<u>Occasional</u>		<u>Experimented</u>		<u>Former</u>	
	entry	grad	entry	grad	entry	grad	entry	grad
After leaving recruit training, do you intend to smoke?								
Definitely No	11	8	33	29	78	78	73	59
Probably No	34	23	41	37	17	18	13	17
Probably Yes	42	48	25	29	4	4	8	18
Definity Yes	14	21	2	5	1	0	6	6
Mean (SD)	2.59 (.85)	2.82 (.86)*	1.95 (.80)	2.09 (.87)*	1.28 (.60)	1.28 (.57)	1.47 (.89)	1.70 (.95)*
							1.04 (.25)	1.06 (.28)

Note. \bar{n} of daily smokers=1199; \bar{n} of occasional smokers=522; \bar{n} of experimenters=516; \bar{n} of former smokers=127; \bar{n} of never smokers=2000.* $p \leq .001$

TABLE 12

Entry-to-Graduation Change in Perceptions of Being a Smoker by Intention Change
among Navy Women Recruit "Smokers"^a (1996-1997)

Change in Perceptions of Being a Smoker	Mean Intention Scores		Paired t	<u>n</u>
	Entry	Grad.		
Consistent Smoker	2.69	3.06	-15.59*	1,074
Negative Change	1.82	2.73	-3.19	11
Positive Change	1.92	1.85	-2.12	720
Consistent Non-smoker	1.19	1.25	-2.74	550
Total	2.10	2.26	-10.43*	2,355

^a Included recruits with any smoking experience prior to entry.
 $p \leq .001$

Correlates of Changes in Intentions to Smoke. To examine sociodemographic and baseline smoking correlates of changes in intentions, a simple intention change variable was computed. At both entry and graduation, “definitely no” and “probably no” categories were combined and assigned as 0, and “definitely yes” and “probably yes” categories were combined and assigned as 1. Using the cross-tabulation of the two recoded dichotomous intention items, four intention change groups were created: (1) those consistent in their intention not to smoke, (2) those making a negative change from no intention at entry to intention to smoke at graduation, (3) those making a positive change entry-to-graduation from intention to smoke to no intention, and (4) those consistently reporting no intention to smoke. Overall, 72% of all participants (n=3,144) were consistent in their intentions not to smoke, and 16% (n=717) were consistent in their intentions to smoke. Eight percent (n=363) and 3% (n=140) made negative and positive changes, respectively.

As with examination of correlates of perceptions of smoking status, analyses were limited to “smokers,” or those with any smoking experience prior to RTC. As shown in Table 13, age was significantly related to changes in intentions among those with any smoking experience, with younger individuals (17-28, and 19-23 years) more likely than older individuals to report a consistent intention to smoke. Intention change was not significantly related to education, although differences were found by racial/ethnic group. Blacks and Hispanics were more likely than other racial/ethnic groups to report a consistent intention not to smoke. Blacks were more likely than other groups to show a positive change in intentions to smoke (10%), and less likely to report a negative change in intentions (8%).

Baseline level of addiction was related to intention change. Those consistent in their intentions to smoke reported the heaviest baseline smoking of the four intention groups, followed by those making a negative change, those making a positive change, and finally, those consistent in their intentions not to smoke. Similarly, changes in intentions to smoke were related to when smokers typically had their first cigarette of the day. Those consistent in their intentions to smoke typically had their first cigarette of the day earlier upon waking than other intention groups, followed by those making a negative change, those making a positive change, and finally, those consistent in their intentions not to smoke after leaving RTC.

TABLE 13

Correlates of Change in Intentions among Navy Women Recruit Entry "Smokers"^a (1996-1997)

Correlate	% or Mean				χ^2 or F
	Consistent intent NOT smoke (n=1164)	Positive change (n=134)	Negative change (n=346)	Consistent intent to smoke (n=710)	
Age					
17-18	49	7	13	31	
19-23	48	4	16	31	
24-35	62	6	14	18	26.36***
Education					
Less than high school	49	6	16	29	
High school	49	6	15	31	
Greater than high school	56	4	15	25	5.42
Race/ethnicity					
White non-Hispanic	48	5	15	32	
Black	58	10	8	24	
Hispanic	55	6	17	22	
Asian/Pacific Islander	45	5	17	33	
Native American	48	2	13	38	41.38***
Cigarettes smoked per day during past 30 days (mean) ^b	1.56	2.94	3.44	4.33	295.97***
Min. after waking have first cigarette during past 30 days (mean) ^c	4.61	4.39	3.94	3.38	59.12***

^a Included recruits with any smoking experience prior to entry.^b Scale includes 1 (less than 1 cigarette on average), 2 (1-5 cigarettes), 3 (6-10 cigarettes), 4 (11-15 cigarettes), 5 (16-20 cigarettes), 6 (21-25 cigarettes), 7 (26-30 cigarettes), 8 (31-35 cigarettes), 9 (36-40 cigarettes), and 10 (more than 40 cigarettes).^c Scale includes 1 (immediately after waking), 2 (within 15 minutes after waking), 3 (15-30 minutes after waking), 4 (31-60 minutes after waking), 5 (61 minutes-2 hours after waking), and 6 (more than 2 hours after waking).*** $p \leq .001$

Recruit Perceptions of the RTC No-smoking Policy. Table 14 presents responses to several Graduation survey items addressing perceptions of the RTC no-smoking policy, policy enforcement, and effects of the policy. The great majority of women recruits knew the RTC rules that ban smoking during training, and most reported that the rules were enforced. Over 60% reported being reminded or encouraged NOT to smoke. Few women (3-4%) reported smoking during training or knowing other recruits who did. Among entry smokers (i.e., those smoking any during the 30 days prior to RTC), 21% reported that the policy at RTC had influenced them by making them want to stay off cigarettes after graduation. Interestingly, 15% of entry smokers felt the policy had made them want to smoke even more after graduation. Almost half of entry smokers reported experiencing some withdrawal symptoms from cigarettes during training.

TABLE 14

Responses of 4,843 Navy Women Recruits to Additional Graduation Survey Items related to the
RTC No-smoking Policy (1996-1997)

Graduation Survey Item	% responding Yes
Do you know the smoking rules for recruits?	93
Were smoking rules generally enforced?	87
Were you reminded/encouraged NOT to smoke?	63
Did you smoke during RT?	3
Did recruits sneak cigarettes?	4
Has the RTC policy made you want to stay off cigarettes?	21 (smokers only) ^a
Has the RTC policy made you want to smoke more?	15 (smokers only) ^a
Did you experience withdrawal symptoms?	48 (smokers only) ^a

^a Reported any smoking in the 30 days prior to entering RTC (n=1821).

8. Short-term Smoking Relapse Rates at the 3-month Follow-up

Smoking Relapse at the 3-month Follow-up. Intervention effects were not a focus at the 3-month follow-up because insufficient time had elapsed for the intervention efforts to be evaluated (e.g., the mailed support intervention group had received only two mailings by the time of the 3-month follow-up survey). However, short-term smoking relapse rates after leaving the RTC-mandated 100% smoke-free environment was of interest. Figure 3 presents overall past-30-day smoking rates at the 3-month follow-up. Slightly over two-thirds of “smokers” had resumed smoking at the 3-months following graduation ($n=724$), and 32% ($n=340$) reported not smoking. Among past-month smokers at entry to RTC, the relapse rate at the 3-month follow-up was 81%.

Table 15 presents reasons participants gave for beginning to start smoking again once leaving RTC. The two most frequently reported reasons were related to helping one relax and handle stress, with over three-fourths of respondents reporting these reasons. Reasons related to presenting an image to others (i.e., to look like an adult, to look cool, to look tough) were rarely reported.

Demographic Correlates of Relapse. Age was inversely correlated with relapse, with those smoking at the 3-month follow-up being about 6 months younger than those not smoking ($t(498.5)=2.41$, $p < .05$). White non-Hispanics had significantly higher relapse rates (71%) than Blacks (50%) and Hispanics (61%) ($\chi^2=22.43$, $df=4$, $p < .001$). Although those with a high school education (68%) and less than high school education (72%) had higher relapse rates than those with more than a high school education (60%), the difference was not statistically significant.

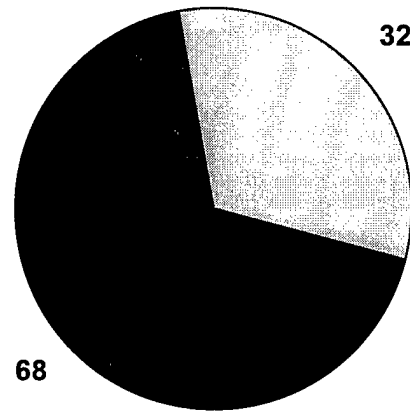
Entry Smoking Correlates of Relapse. As shown in Figure 4, the smoking rate at the 3-month follow-up varied considerably by the type of smoker at entry: 89% of daily smokers at entry to RTC had relapsed at the 3-month follow-up, yet only 31% of entry experimenters reported smoking at 3-months post-graduation. Those reporting they were occasional or former smokers at entry to RTC were smoking at the 3-month assessment in rates of 66% and 52%, respectively.

Level of addiction at entry into the Navy also was related to relapse at 3-months after leaving RTC as evidenced by both parametric (i.e., t-tests) and non-parametric (i.e., Mann-Whitney U) tests. Compared to those who were not smoking at the 3-month follow-up, those who had relapsed had smoked a greater number of cigarettes on typical days that they smoked prior to entering RTC ($t(778)=-6.49$, $p < .001$), and usually had their first cigarette of the day earlier ($t(190.47)=5.66$, $p < .001$). Intention to smoke as assessed at entry to training was related to smoking at the 3-month follow-up, with relapsers having a higher mean intention-to-smoke score (2.29) than non-relapsers (1.51) ($t(758.59)=14.55$, $p < .001$).

FIGURE 3

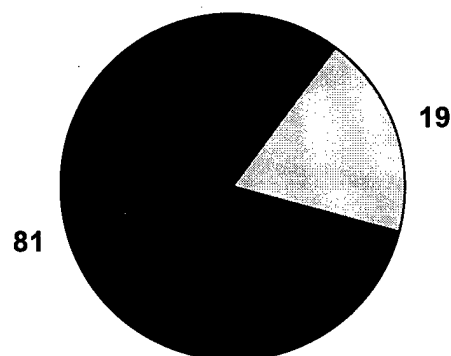
Prevalence of Smoking among Navy Women Recruits at the 3-month

Follow-up (1996-1997)



Entry "Smokers"^a

Smoked past 30 days at Follow-up



Entry Past 30-day Smokers^b

^a Includes all recruits with any smoking experience prior to entry (n=1,064).

^b Includes past 30-day smokers at entry (n=780).

TABLE 15

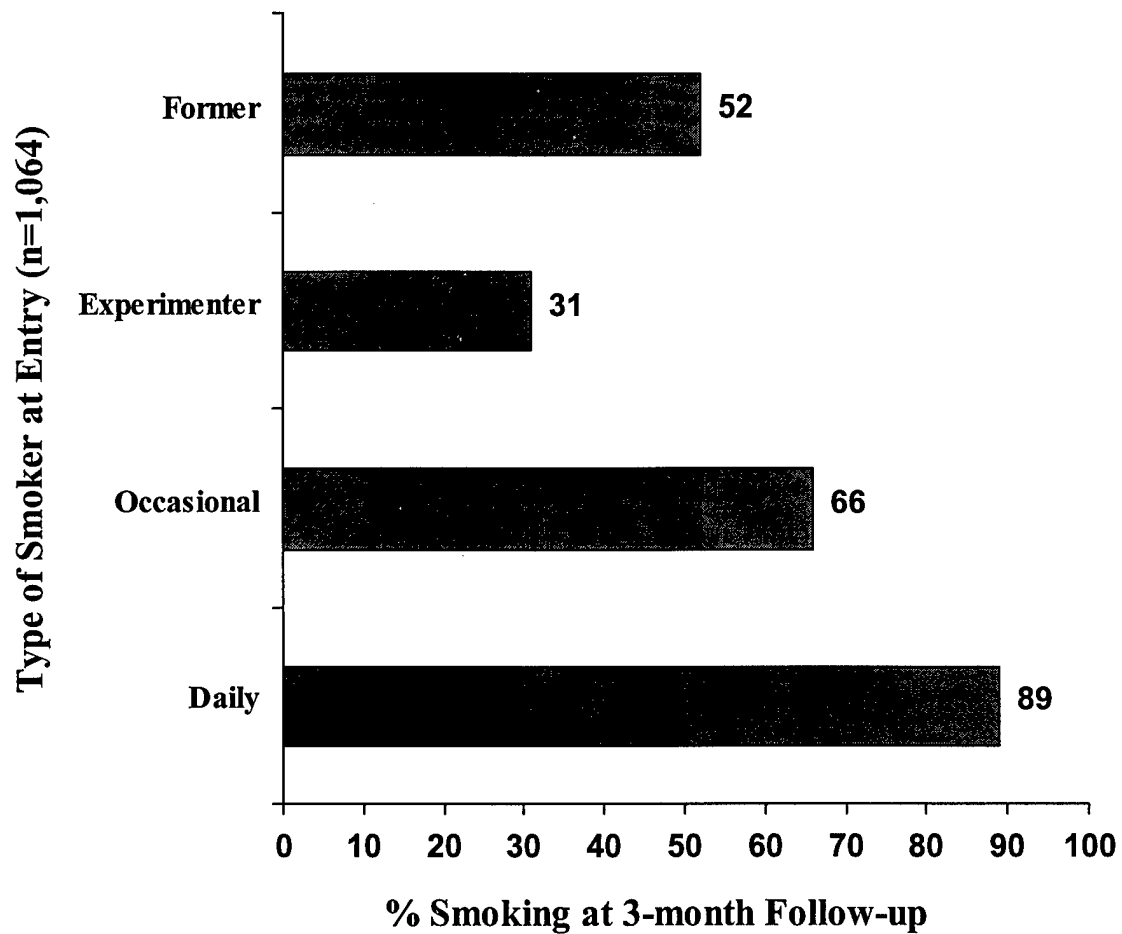
Reasons for Returning to Smoking after Recruit Training among Navy Women Recruits (1996-1997)

Reason	% responding yes
To help me relax	79.3
To help me handle stress	75.3
To satisfy a craving	56.9
For the enjoyment of it	55.6
Because I enjoy smoking when drinking	54.6
To help me when I'm bored	46.7
For the taste	31.0
To keep my weight down	27.6
To help me concentrate	22.1
Because most of my friends smoke	18.4
To fit in with the group	9.3
To take more work breaks	6.9
To help me meet people	5.6
To take a dare	3.2
To look and feel like an adult	2.1
To show that I'm cool	1.6
To show that I'm tough	0.3

Note. Respondents to the telephone and postcard versions of the 3-months survey did not complete items assessing reasons for relapse; therefore, the number of respondents is reduced in this analysis (n=374-377).

FIGURE 4

Prevalence of Smoking among Navy Women Recruits at the
3-month Follow-up by Type of Entry Smoker (1996-1997)



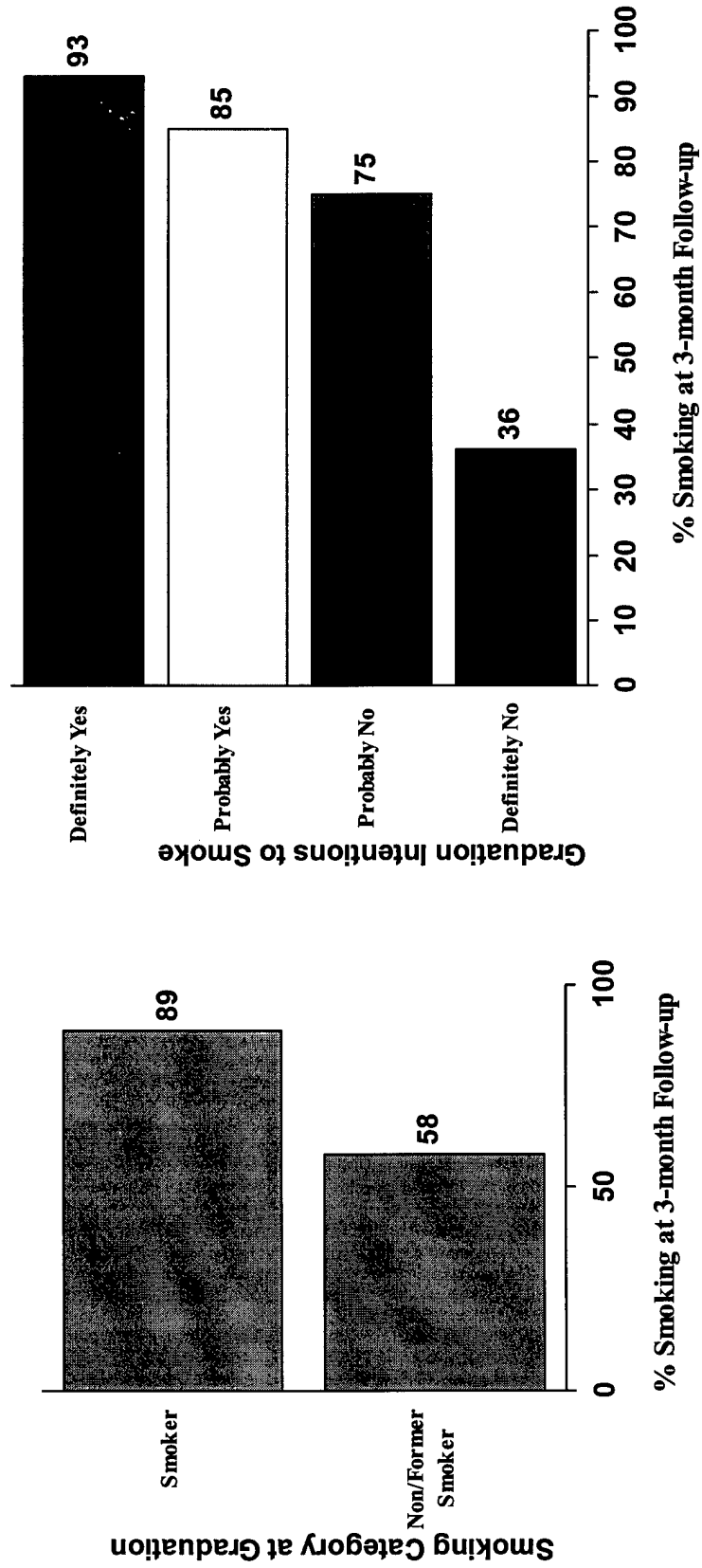
Graduation Correlates of Relapse. Figure 5 presents variables measured at graduation as correlates of smoking at the 3-month follow-up. Those who still perceived themselves as smokers at graduation were far more likely to be smoking three months after leaving RTC than those reporting they were non/former smokers at graduation (89% versus 58%). In addition, intentions to smoke after leaving RTC as reported at graduation were strongly associated with smoking after graduation. Of interest is the dramatic difference between the smoking rates of those definitely not intending to smoke after leaving RTC (36%) and the other three intention categories.

Multivariate Analysis of Entry and Graduation Correlates of Relapse. The correlates in the above three sections were used in a multivariate logistic analysis to concurrently examine the association of demographic characteristics, entry smoking variables, and graduation smoking variables as correlates of relapse at the 3-month follow-up. Experimental condition was entered into the model first, and then the other correlates were allowed to step in a forward stepwise method. Race/ethnicity, intentions to smoke measured at entry and graduation, and first cigarette of the day as measured at entry did not enter the model. Education, number of cigarettes smoked at entry, and age were marginally significant ($p < .10$), although 95% confidence intervals showed the relationships to be unreliable. As shown in Table 16, two variables were significantly related to relapse: type of smoker at entry and perceptions of being a smoker at graduation. Relative to those considering themselves experimenters at entry, the odds of relapse were significantly higher for occasional ($OR=2.35$) and daily ($OR=4.32$) smokers. Those still perceiving themselves as smokers at graduation were twice as likely to have relapsed by the 3-month follow-up as those considering themselves to be non/former smokers.

Figure 5

Graduation Predictors of Smoking at 3-Month Follow-up among Navy Women Recruits

(1996-1997)^a



^a Includes all recruits with any smoking experience prior to entry (n = 910)

TABLE 16

Results of Forward Stepwise Logistic Regression Predicting Smoking Relapse fromEntry and Graduation Variables among Navy Women (1996-1997)

Correlate	Adjusted OR	95% CI	p
Type of Entry Smoker			
Experimenter ^a	--	--	
Occasional	2.35	1.09, 5.02	.027
Daily	4.32	2.02, 9.21	.000
Former	1.25	.396, 3.95	.701
Perceived Smoking Status at Graduation	2.05	1.27, 3.29	.003

^a Reference group

Note. Age, education, race/ethnicity, intentions to smoke at entry, cigarettes smoked in the 30 days prior to entry, minutes after waking one typically smokes her first cigarette, and intentions to smoke at graduation did not enter the model.

Navy-related Factors as Correlates of Relapse. Using univariate analyses, several Navy-specific factors were examined as correlates of smoking at the 3-month follow-up. Over 70 enlisted occupational fields were combined into 9 broad DoD Occupational Area Groupings according to a coding scheme used by the Navy (DoN, July, 1990). Other coding schemes have been developed (e.g., USNI Bluejacket Manual, 1990), but the DoD groupings were used here because they were thought to resemble civilian-type jobs. Although many Navy occupations are mechanical or technical, some would be considered in civilian life as white-collar jobs. One DoD grouping (Infantry, Gun Crews, and Seamanship Specialists) was not used in the present study because few women in the sample were assigned to the occupational fields that make up that grouping. In addition, a grouping was added (General Detail) that is not comprised of actual occupational fields. Individuals in this category do not yet have an occupational specialty, but rather, are assigned general tasks such as painting detail. Over one-third of the sample followed at the 3-month were assigned to General Detail.

Table 17 presents smoking rates at the 3-month follow-up by occupational grouping. The number of women assigned to the Service and Supply area and Other Technical specialties was probably too small to make meaningful comparisons. Those training and working in the area of Electronic Equipment had the highest relapse rate (80%), a considerably higher rate than that seen among supposedly "unskilled" individuals assigned to General Detail (66%). Those in the Medical and Dental occupations had the lowest smoking rate (53%) at the 3-month follow-up.

Although the Navy environment is one that is generally considered non-traditional for women, there are some occupations that are more traditional for women (personnelman, hospital corpsmen) to perform than others (fire control technician, builder). Using categorizations developed by a Navy researcher (Thomas, Monda, Mills, & Mathis, 1982), the two broad DoD occupational groupings of Functional Support and Administration, and Medical and Dental were combined to form traditional jobs, and other groupings were combined to form non-traditional jobs (General Detail was excluded from this categorization). As shown in Table 17, relapse rates at the 3-month follow-up were significantly higher among women assigned to nontraditional occupations (71%) than those assigned to traditional occupations (62%).

TABLE 17

Navy Factors related to Smoking at the 3-month Follow-up among Navy Women Recruits(1996-1997)

Navy Factor	<u>n</u>	% smoking at 3-month follow-up	χ^2
<u>DoD Occupational Grouping</u>			
Electronic Equipment (sonar technician)	78	80.8	
Functional Support and Administration (personnelman)	99	72.7	
Electrical/Mechanical Equipment (machinist's mate)	168	71.4	
Communications and Intelligence (signalman)	87	67.8	
Craftsman (builder)	40	67.5	
General Detail	363	66.4	
Service and Supply (mess management)	19	63.2	
Other Technical (aerographer's mate)	12	58.3	
Medical and Dental (hospital corpsmen)	126	53.2	21.23*
Traditional	255	61.8	
Nontraditional	404	71.3	5.99*
Shore-intensive	207	71.5	
Sea-intensive	221	72.7	.09
<u>Advancement in Paygrade</u>			
Seaman Recruit	125	76.8	
Seaman Apprentice	556	69.4	
Seaman	313	61.3	
3 rd Class Petty Officer	66	66.7	11.31*

* $p \leq .01$

Although virtually all enlisted Navy personnel can expect to go to sea, there are certain occupations that are more sea-intensive (e.g., aviation electronics technician) than others (e.g., air traffic controller). Smoking rates at the 3-month follow-up did not differ with regard to sea- versus shore-intensive occupations. With regard to advancement in particular occupations, there was little variation at the 3-month follow-up, with the great majority of women still at the lowest paygrades or ranks (Seaman Recruit and Seaman Apprentice). However, paygrade was obtained again 12 months later at the end of the 3-month data collection period (September, 1997), allowing more time to have earned promotions. This variable, Advancement in Paygrade, served as a type of crude performance measure. As shown in Table 17, those participants at the lower paygrades had higher smoking rates than those who had advanced relatively quickly in their occupations (Seaman and 3rd Class Petty Officer), although only the difference between Seaman Recruits (77%) and Seaman (61%) was statistically significant.

Multivariate logistic regression was conducted to determine if occupation and advancement in paygrade were independently associated with smoking at the 3-month follow-up after controlling for effects of age, education, and type of smoker at entry. Traditional versus nontraditional job status was not included because of its redundancy with occupation. Results showed that after controlling for age, education, and type of smoker at baseline, only occupation was significantly related to smoking at the 3-month follow-up (see Table 18). Smoking rates of women working in the Electronic Equipment area were significantly higher than those of women working in Electrical/Mechanical Equipment, Communications and Intelligence, Craftsman, and particularly, General Detail and Medical/Dental.

Several other factors describing the smoking policy of one's current command were examined as potential cross-sectional correlates of smoking at the follow-up. Overall, 87% knew what the smoking rules were at their command, a percentage that did not differ significantly by smoking status at the 3-month assessment. In addition, smokers and non-smokers did not differ in their reports of the degree to which their current command enforced smoking rules. On the other hand, those smoking at the 3-month assessment were more likely than non-smokers (10% versus 0%) to report that their current command's smoking policy had made them want to smoke even more ($\chi^2 = 19.13$, $df=2$, $p < .001$, although the nature of the policies (e.g., how restrictive) and how they influenced smoking is not known.

TABLE 18

Results of Logistic Regression Predicting Smoking Relapse from Navy Occupation
among Navy Women^a (1996-1997)

Correlate	Adjusted OR	95% CI	p
<u>DoD Occupational Grouping</u>			
Electronic Equipment ^b	--	--	--
Functional Support and Admin.	.47	.199, 1.09	.078
Electrical/Mechanical Equipment	.45	.207, .961	.039
Communications and Intelligence	.25	.107, .601	.002
Craftsman	.34	.119, .951	.039
General Detail	.33	.158, .685	.003
Service and Supply	.32	.090, 1.12	.077
Other Technical	.47	.104, 2.14	.333
Medical and Dental	.18	.079, .401	.000

^a n=990 women with any smoking experience prior to entry.

^b Reference group

9. *Intervention Effects and Smoking Relapse up to 12-months after RTC*

Intervention Effects and Smoking Relapse at the 3-, 6-, and 12-month Follow-ups Post Graduation from RTC. Overall, the two interventions tested in this study produced smoking prevalence rates that did *not* differ from those of the control group. Women recruits that had any experience with smoking prior to entering the Navy (i.e., current smokers, experimenters, and former smokers) comprised the group followed over the year post recruit training. Using the “traditional” definition of being a current smoker (i.e., smoked during the past 30 days), about 77% of incoming women recruits were current smokers prior to entering the Navy and 57% were current smokers after being in the Navy for about one year (see Table 19). This decline of 20 percentage points represented a highly statistically significant ($p < .001$) change across the four repeated assessments (see Table 20). There were no significant differences among groups, although there was a very weak trend for an interaction between the phone group and time ($p = .152$).

Figure 6 provides a pictorial view of the results for smoking prevalences among groups and over time, as indicated by the results in Tables 19 and 20. There is a clear decline in smoking prevalence for all three groups over time. Also, the smoking prevalences for each of the groups cluster consistently at the assessment points with the exception of the phone group at the 3-month follow-up. The phone group’s smoking prevalence is slightly lower than expected three months post graduation from RTC, which produces the trend for an interaction by time.

TABLE 19

Past 30-day Smoking Prevalence: Follow-up Trends among Those with Any Smoking Experience at Entry to RTC

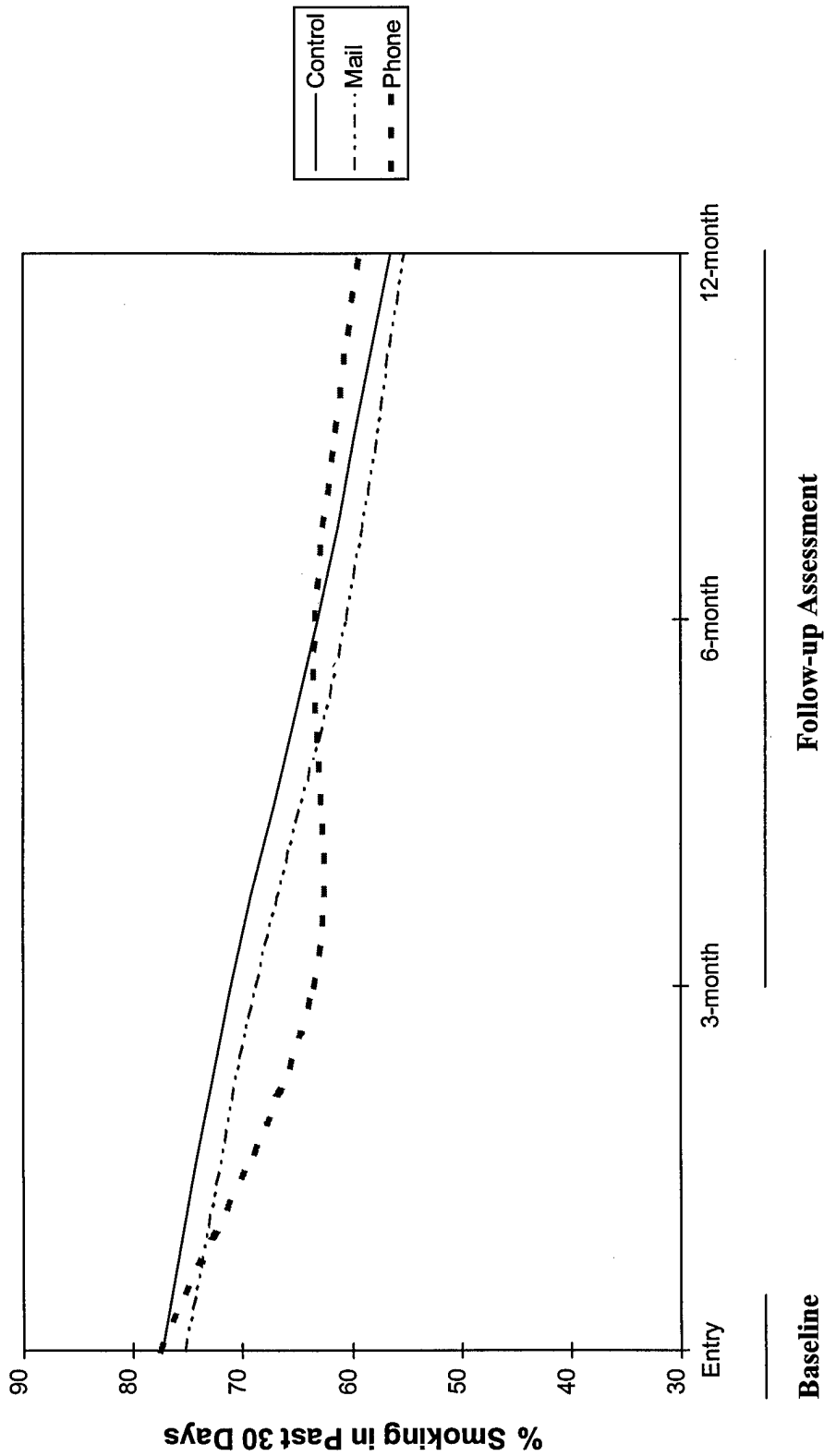
Condition	% Smoking in Past 30 Days			
	Baseline Entry	Follow-up Assessment		
		3-month	6-month	12-month
Control	77.4	71.1	63.1	56.5
Mail	75.4	68.9	60.6	55.3
Phone	77.7	63.6	63.4	59.5
All Groups	76.8	67.9	62.4	57.1

TABLE 20

Analysis of Intervention Effects and Changes over Time Using Generalized Estimating Equations (GEE) Methods to Determine Independent Effects among Those with Any Smoking Experience at Entry to RTC

Parameter	GEE Estimate	95% Confidence Interval	Z	p-level
<u>Experimental Condition</u>				
Phone Group	-.193	(-.515, 0.130)	-1.17	.242
Mail Group	-.069	(-.393, 0.256)	-0.41	.678
Control Group	--	--	--	--
<u>Changes over Time</u>				
Time	-.048	(-.071, -.024)	-4.01	.001
<u>Interactions</u>				
Phone x Time	.024	(-.009, 0.057)	1.43	.152
Mail x Time	-.002	(-.036, 0.031)	-0.13	.900
Control x Time	--	--	--	--
<u>Intercept</u>	.508	(0.280, 0.736)	4.37	.001

FIGURE 6
Past 30-day Smoking Prevalence: Follow-up Trends among Those with Any Smoking Experience at Entry to RTC.



Correlates of Smoking Relapse at the 12-month Follow-up. In our 1997 Progress Report, we reported the results of an analysis examining independent correlates of relapse at a 3-month follow-up (i.e., 3 month after participants graduated from RTC). The correlates examined in that analysis included:

- (a) sociodemographic characteristics
 - 1. age
 - 2. race/ethnicity
 - 3. education
- (b) baseline smoking variables measured at entry into the Navy
 - 1. type of smoker (i.e., experimenter, occasional, daily, or former)
 - 2. number of cigarettes typically smoked per day in the past 30 days
 - 3. minutes until first cigarette of the day
 - 4. intentions to smoke after leaving RTC
- (c) smoking variables measured at graduation from RTC
 - 1. perceptions of still being a smoker
 - 2. intentions to smoke after leaving RTC.

Multivariate analysis of the 3-month follow-up data showed that two variables were significantly related to relapse: the type of smoker one was at entry, and perceptions of being a smoker at graduation. More specifically, relapse was more than 2 times higher among occasional smokers and 4 times higher among daily smokers than among experimenters. Relapse was higher among those still perceiving themselves as smokers at graduation than among those considering themselves to be non/former smokers.

Here, we examine the same set of variables as potential correlates of relapse at the final *12-month* follow-up. Two variables entered the model, type of smoker and number of cigarettes typically smoked per day in the 30 days prior to entering RTC, both of which can be considered measures of a smoker's level of addiction at baseline. As shown in Table 21, occasional and daily smokers were both about 4 times more likely to have relapsed by the 12-month follow-up than experimenters. Surprisingly, *former* smokers were almost 6 ½ times more likely to have relapsed than experimenters. However, the few number of cases in this group (n=20), and the absence of an increased risk of relapse among former smokers at the 3-month follow-up suggest that this finding may be spurious and should be interpreted with caution. The number of cigarettes typically smoked per day at entry was associated with relapse at the 12-month follow-up, such that the greater the amount smoked, the more likely one was to have relapsed.

TABLE 21

Results of Forward Stepwise Logistic Regression Predicting Smoking Relapse at the 12-month Follow-up^a

Correlate		Adjusted Odds Ratio	p
<u>Type of Entry Smoker</u>	<u>(% Relapse)^b</u>		
Experimenter ^c	(23.8)	--	--
Occasional	(55.6)	3.74	.001
Daily	(77.3)	4.00	.001
Former ^d	(38.6)	6.46	.006
Number of Cigarettes Typically Smoked per Day at Entry ^e		1.32	.000

^a Analysis based on 709 recruits with any experience smoking prior to entering Navy.

^b Percent that smoked during the past 30 days.

^c Reference group.

^d Caution should be taken in interpretation since this group is very small (n=20).

^e Scale ranged from 0 (0 cigarettes per day in the 30 days prior to RTC) to 10 (typically more than 40 cigarettes per day in the 30 days prior to RTC).

Note. Age, education, race/ethnicity, intentions to smoke at entry, minutes after waking one typically smokes her first cigarette, perceptions of being a smoker at graduation, and intentions to smoke at graduation did not enter the model.

10. Publications, Presentations and Awards (cumulative)

Appendix C includes copies of publications, manuscripts, and abstracts of presentations.

Manuscripts

1. Conway, T.L. (1998). Tobacco use and the United States military: a longstanding problem. Tobacco Control, 7, 219-221.
2. Conway, T.L., Woodruff, S.I., Edwards, C.C., Elder, J.P., Zhu, S.-H., Hervig, L.K., Hurtado, S.L. (1996). Operation Stay Quit: smoking relapse prevention for Navy women recruits. The Health Psychologist, 18(2), 4-5.
3. Weaver, K.B., Woodruff, S.I., Conway, T.L., Edwards, C.C., Zhu, S.-H., Elder, J.P. (1998). Does the US Navy attract young women who smoke? Occupational and Environmental Medicine, 55, 792-794.
4. Woodruff, S.I., Edwards, C.C., Conway, T.L. (1998). Enhancing response rates to a smoking survey for enlisted U.S. Navy women. Evaluation Review, 22(6), 780-791.
5. Woodruff, S.I., Conway, T.L., Edwards, C.C., Elder, J.P. (1999). The United States navy attracts young women who smoke. Tobacco Control, 8, 222-223.
6. Woodruff, S.I., Conway, T.L., Edwards, C.C. (1999). Effect of an 8-week smoking ban on women at US navy recruit training command. Under review.
7. Woodruff, S.I., Conway, T.L., Edwards, C.C. (1999). Increasing response rates to a smoking survey for U.S. navy enlisted women. Under review.
8. Edwards, C.C., Woodruff, S.I., Conway, T.L. (Sept./Oct. 1999). Operation Stay Quit: Preventing smoking relapse among U.S. navy women. American Journal of Health Behavior, 23(5), 352-355.

Presentations

1. **1998 American Public Health Association Annual Meeting.** An abstract entitled "Operation Stay Quit: A mail intervention to prevent smoking relapse among Navy women recruits" was accepted and will be presented in November, 1998, at the APHA annual meeting in Washington, DC. See Appendix B for a copy of the abstract.
2. **San Diego Biostatistics and Epidemiology Research Exchange, 1997.** An abstract entitled "Smoking in US Navy women recruits: sociodemographic

correlates and comparisons with civilian women” was presented at this annual conference.

3. **Recruit Training Command, Great Lakes, Briefing 7/9/97.** See Appendix C in the 1997 Annual Report.
4. **1996 American Public Health Association Annual Meeting.** An abstract entitled “Effect of an 8-week involuntary smoking ban on women’s perceptions of being a smoker” was presented at the APHA annual meeting in New York, NY.

Thesis/Dissertation

1. *Doctoral Dissertation.* In June, 1998, a Ph.D in epidemiology was awarded to Susan Woodruff (Operation Stay Quit co-investigator). The dissertation was entitled “The epidemiology of smoking among US Navy women recruits: Prevalence, correlates and short-term effects of involuntary cessation.”
2. *Master’s Thesis.* In May, 1997, the M.P.H. degree in epidemiology was awarded to Kathleen Weaver (Operation Stay Quit graduate assistant). Ms. Weaver’s master’s thesis was entitled “Smoking in U.S. Navy women recruits: Sociodemographic correlates and comparisons with civilian women.”

Awards

1. *Augmentation Award for Science and Engineering Research Training (AASERT).* Operation Stay Quit was granted an AASERT award in the amount of \$71,392 for a 2.5 year period. This award is supporting the work and professional development of one graduate-level research assistant.

III. Conclusions/Discussion

A. Findings

1. Smoking and Cessation Experiences at Entry to RTC

Results from the present study suggest that young women have unusually high smoking rates upon entry to the Navy, supporting clinical impressions among military physicians that many young people are already smokers by the time they enlist (Gunby, 1996). Rough comparisons with other population-based surveys of older teens and adult civilians suggest that female Navy recruits are more likely to smoke than their civilian counterparts, and to smoke heavier (e.g., Weaver, Woodruff, Conway, Edwards, Zhu, & Elder, 1998). For example, 42.5% of the present Navy recruit sample reported having smoked in the past month compared to 28% of high school seniors surveyed in the 1992 Monitoring the Future Project (cited in USDHHS, 1994). Although 66% of Navy recruit smokers reported smoking *everyday*, 48% of older teen smokers reported such frequent use (Moss, Allen, Giovino, & Mills, 1992). The average reported age of regular smoking was 16 years for Navy women, a younger age than the 17.7 years reported in the 1991 National Household Surveys on Drug Abuse (NHSDA). Two additional measures suggest that Navy recruits may be more nicotine-addicted than their civilian counterparts. While 27% of all recruits reported smoking six or more cigarettes a day, approximately 14% of older teens reported such "heavy" use on the 1991 NHSDA. Somewhat similar percentages of Navy recruit (45%) and civilian smokers in California (49%) report having their first cigarette of the day within 30 minutes of waking, although the recruit sample is roughly half the age (Pierce et al., 1994).

Although recruits appeared to fare worse than civilians with regard to smoking behavior, they were not lacking interest in or attempts at cessation. Sixty-five percent of recruit smokers reported having ever tried to quit, a percent comparable to that (64%) estimated from the Teenage Attitudes and Practices Survey—TAPS (Allen, Moss, Giovino, Shopland, & Pierce, 1993, cited in USDHHS, 1994). About 59% of recruits had made a quit attempt in the 12 months prior to RTC that lasted for a day or more, a proportion similar to that (57%) found among persons 18-24 years in a population-based survey (CDC, 1993), and slightly higher than the 53% reported for a representative sample of Navy active-duty military personnel that excluded recruits (Bray et al., 1995). Repeated quit attempts during the previous 12 months were made by about 42% of recruit smokers compared to 39% of female high school smokers (Stanton, Lowe, & Gillespie, 1996). The percent of recruits having made a quit attempt in the past year that lasted more than one day was 55%, compared to 50% of female smokers in the 1993 California Tobacco Survey (Pierce et al., 1994). Female Navy recruit and high school smokers (Stanton, Lowe, & Gillespie, 1996) who had ever tried to quit reported similar durations of their longest quit attempt: 58.2% and 57.6%, respectively, reported a four-week or more quit period; 14% and 20%, respectively, reported a 2-3 week quit period; and 27% and 22%, respectively, reported a quit period of 1 week or less. In short, women coming into the

Navy appear to be smoking at a higher and heavier level than same-age civilians, although their quit attempts and cessation experiences consistently appear to be similar. These comparisons, however, are crude for several reasons. They are not adjusted for differences in sociodemographic characteristics such as education and race and there are differences in smoking definitions across surveys. To deal with these issues, the present study attempted a stricter comparison of recruit-civilian smoking rates using standardization procedures.

2. Standardized Comparison of Recruits and Civilians

Standardized comparisons showed that Navy women recruits had significantly higher rates of current smoking than civilian women overall (38.7% versus 28.8%), among 17-18 year olds, and among 19-23 year olds. Navy women recruits who were 17-18 years old had 2½ times the rate of current smoking than civilians, and women 19-23 had over 1½ times the rate of civilians. After standardization, rates of current smoking were not significantly different for recruits and civilians in the 24-35 age range.

These Navy-civilian differences are similar to those reported in a previous comparison of these Navy women recruits with a different population-based civilian sample (Weaver et al., 1998). In the Weaver et al. analysis, recruits in the present study were compared to civilian women 18-30 years of age drawn from the 1993 National Health Interview Survey (NHIS). Recruits 17 years of age and those over 30 were dropped from the Weaver et al. analysis for comparability with NHIS age ranges, and current smoking was defined differently than in the present study. Nonetheless, results were strikingly similar to those reported in the present study in terms of the magnitude of Navy-civilian differences, with Navy recruits smoking at a rate of 36% relative to 24% in the civilian sample standardized to the Navy distribution of education and race/ethnicity. Recruits 18 years of age had more than twice the smoking rate of civilians, and 19-23 year old recruits were 1½ times more likely to smoke than same-age civilians. The Weaver et al. study also replicated the present finding of no statistically significant differences among older recruits: after standardization, smoking rates for recruits 24-30 years of age (32%) did not differ significantly from NHIS civilians (26%) in the same age range.

Based on the present findings, the Navy appears to attract young female smokers, and the high rate of smoking among incoming recruits cannot be accounted for by sociodemographic characteristics. The present study cannot determine what specific factors, other than age, education, and race/ethnicity, might account for the high rate of smoking among women entering the Navy. Other potential variables that may lead young women who smoke to join the Navy were not considered in this study. For example, certain "unconventional" personality factors and behaviors including risk-taking, sensation-seeking, rebelliousness, and self-confidence have been associated with smoking in young women (Chassin, Presson, Sherman, 1989; Leventhal, Fleming, & Glynn, 1988; Conrad, Flay, & Hill, 1992; Clayton, 1991; Killen, Robinson, Haydel, Hayward, Wilson, Hammer, Litt, & Taylor, 1997), and perhaps these same characteristics are associated with enlisting in the military. It is not known if women (or men) who join

the military score high on these personal factors. Early studies of women's decisions to join the military reported a wide range of primary conscious motivations, some stereotypical (e.g., to meet men; to "escape" from one's parents or small town environment) and others less so (e.g., search for self-improvement and identity; an alternative to marriage, college, or working at an unskilled job) (Eberhart & Socrides, 1953; Horn, 1965; Plog & Kahn, 1974). A follow-on study conducted in the late-1970s found few differences between men and women regarding their reasons for enlisting in the US Navy (Thomas, 1977). At the time of the Thomas (1977) study, most barriers to equal opportunity in the military had recently been lifted, and men and women entering the Navy were making similar occupational choices. Both sexes reported enlisting for the same reasons: to make something of their lives, to acquire education and training, and to travel. How health behaviors, such as smoking, might relate to reasons for enlisting in the military is not known and further, these relationships may have changed over time.

It is important to note that both men *and* women coming into the Navy have high smoking rates relative to age-matched civilian comparisons, and so investigation of the enlistment-smoking relationship for women cannot properly be examined by comparing male and female enlistees' person-related and motivational factors. More appropriate comparisons would be of women who join the military versus those who do not. Of interest are results of the Monitoring the Future Project survey of possible risk factors for smoking among high school seniors from 1985 to 1989 (CDC, unpublished data, cited in USDHHS, 1994). Males who planned to enter the armed forces after high school were more likely to be past-month smokers or heavy smokers than males who did not have such plans. Interestingly, the association was negligible among females.

Apart from personal factors, other unmeasured background variables might partly explain the disproportionately high smoking rate among young women who enter the Navy. Geographic differences might exist, such that women from regions with higher smoking rates may join the Navy in particularly high numbers. For example, the 1996 state-specific smoking prevalence among adult women varied more than twofold, with 13% of women in Utah smoking versus 30% in Kentucky (CDC, 1997b). In addition, there may also be differences in family and parental patterns of tobacco use between women who choose to join the Navy and the general population. Girls more than boys appear to be influenced by their parents' smoking behaviors and attitudes (Fried, 1994). Young women who join the Navy may be more likely to have fathers who both served in the military and who smoke, consequently influencing their daughters to join the military and to smoke.

3. Correlates of Smoking at Entry to RTC

The current study of Navy women recruits found smoking to be independently associated with age, race/ethnicity, and education. These results are generally congruent with those reported in previous studies of civilian and military populations, with White women in their early 20s who have a high school education or less smoking at relatively higher rates. Bray et al. (1995) found similar associations of education, race/ethnicity, and age

with current smoking in a representative sample of active-duty military personnel that excluded recruits. Another study found similar associations among female active-duty military personnel (Kroutil, Bray, & Marsden, 1994).

In the present study, recruits 19-23 years of age had the highest rate of smoking (45%) upon entry to the Navy, somewhat higher than younger recruits 17-18 years of age (41%) and particularly higher than recruits 24 years and older (34%). Studies of military populations have typically excluded 17 year olds, and the reason for the slightly lower rate among the youngest age group (17-18 years) is probably due to the fact that 17 year olds are minors and cannot legally purchase cigarettes. Although tobacco purchase laws are not consistently enforced, they are likely to place some restrictions on access (and therefore smoking uptake) among the 17 year olds.

The current study found the lowest rates of smoking among Black women recruits, and highest rates among Whites and Native Americans. Smoking rates of Hispanics and Asian/Pacific Islanders also were significantly lower than Whites, with these groups being about half as likely to be smoking at entry to recruit training. The relatively low smoking rate among *young* Black females has been reported elsewhere, in both national surveys (Bachman, Wallace, O'Malley, Johnston, Kurth, & Neighbors, 1991; Headen, Bauman, Deane, & Koch, 1991; Geronimus & Korenman, 1993; CDC, 1991a; CDC, 1991b) and studies of military active-duty personnel (Bray et al., 1995; Kroutil, Bray, & Marsden, 1994). However, studies indicate that Black middle-aged adults are *more* likely to smoke than are White middle-aged adults, perhaps due to lower rates of cessation among Black smokers and delayed initiation after the teen years (Remington, Formen, Gentry, Marks, Hogelin, Trowbridge, 1985; CDC, 1987; CDC, 1991b). Analysis of data from the NHIS confirmed higher quit rates among White women, and delayed initiation among Black women (Geronimus, Neidert, & Bound, 1993; CDC, 1994b). Further, a convergence (and suggestions of a crossover) in Black-White smoking rates by age 30 was reported. Military studies also show lower rates of smoking among Blacks relative to other race/ethnic groups (particularly Whites), but the disparity becomes smaller among older active-duty personnel (Kroutil, Bray, & Marsden, 1994; Bray et al., 1995). Relatively high smoking rates were found among Native American women recruits (49%), the only racial/ethnic group whose smoking rate approached that of non-Hispanic Whites. This finding is in agreement with a national survey of high school seniors that showed the past-month smoking prevalence was 44% among Native American females (Bachman, Johnston, & O'Malley, 1991).

National and military health surveys have reported education to be one of the more important independent predictors of smoking (Kroutil, Bray, & Marsden, 1994; Pierce et al., 1989), a finding that was replicated in the present study. Education showed a strong inverse relationship with smoking at entry to recruit training even among this recruit sample that is relatively homogeneous with regard to age and education. Relative to recruits with more than a high school education, the odds of smoking were 3.8 times greater among those with less than a high school education, and about twice as likely among those with only a high school education.

High prevalence of smoking among certain socioeconomic groups (e.g., lower educated) may reflect lower cessation rates, possibly due to higher levels of physiological dependence (i.e., more heavily addicted smokers), fewer successful quit attempts, social norms that continue to favor smoking, and a general lack of interest in cessation because of more immediate concerns (O'Loughlin, Paradis, Renaud, Meshefedjian, & Barnett, 1997).

4. *Effects of Involuntary Cessation on Smoking Perceptions and Intentions at Graduation*

Analysis of entry-to-graduation changes among all recruits showed a significant 39% reduction in the percent who perceived themselves as smokers (41% to 25%), a reduction similar to that previously reported for male recruits (40% reduction) and a small sample of female recruits (43% reduction) (Hurtado & Conway, 1996; Hurtado & Conway, 1991). This reduction is far greater than the change (i.e., an *increase* of 29% in a study conducted by Cronan, Conway, & Hervig, 1989) that could be expected had no smoking ban been in place during recruit training. In the present study, 37% of past-30 day smokers reported being non-smokers at graduation, although 60% were steadfast in their reports of being a smoker.

Among recruits with any smoking experience, a number of demographic and baseline smoking variables were predictive of positive entry-to-graduation changes in perceptions of oneself as a smoker (or the maintenance of positive perceptions). To a large degree, the same sociodemographic correlates of smoking at entry to recruit training also were related to changes in perceptions of being a smoker. Older recruits; Blacks, Hispanics, and Asian/Pacific Islanders; and those reporting greater intentions at entry not to smoke were more likely to consistently maintain a perception of themselves as a non-smoker, or to make a positive entry-to-graduation change in perception from smoker to non-smoker. Education also was related to changes in perceptions in a complex pattern. Those with a high school education or less were somewhat similar in their changes: a relatively small percent (15% to 23%) consistently saw themselves as non-smokers, almost half consistently saw themselves as smokers, and over 30% reported a positive change in perceptions toward being a non-smoker. Relatively fewer of those with more than a high school education made a positive change, but a full 36% consistently perceived themselves as a non-smoker. Those less addicted to smoking at entry were most likely to show a positive change: infrequent smokers, lighter smokers, and those who typically delayed having their first cigarette of the day were more likely than their counterparts to perceive themselves as a non-smoker by graduation.

5. *Effects of Involuntary Cessation at RTC on Smoking at the 12-month Follow-up*

Among all women recruits with any smoking experience *prior* to entering the Navy, the relapse smoking rates (i.e., percent that smoked in the past 30 days) were 68%, 62%, and 57% at the 3-, 6-, and 12-month follow-ups post RTC. However, relapse varied considerably by the type of smoker one was at entry to recruit training. For example, at

the 12-month follow-up, the relapse rates ranged from 24% smoking among entry experimenters (i.e., 76% cessation rate—not smoking at the 12-month follow-up) to 77% smoking among entry daily smokers (i.e., 23% cessation rate—not smoking at 12-month follow-up). Similarly, considering only the women who reported that they had smoked during the 30 days prior to entering the Navy, their smoking relapse rate was 79% smokers (i.e., 21% cessation rate—not smoking) at 12-month follow-up. *Thus, the most conservative estimate of the **minimum** smoking cessation rate after one year in the Navy is 21% for Navy women.*

Identifying an appropriate group with which to compare relapse rates is difficult for several important reasons. Studies differ in their definitions of smoking and cessation, their data collection timeframes, and, most important, their target study group. The present study focused on women experiencing protracted *involuntary* 24-hour-a-day abstinence from smoking. Ideal comparison data to assess the effects of the 8-week ban on subsequent smoking rates would be those from a longitudinal study of a representative sample of military women not exposed to the 8-week smoking ban during recruit training. Such a study could provide spontaneous quit rates that naturally occur during the first year of naval service. Although such an investigation has not been conducted, a study of 682 men entering the Navy in the summer of 1987 before the RTC smoking ban had been implemented found that 6.8% reported being quit one year later (Cronan, Conway, & Kaszas, 1991). This figure was considered comparable to the 6% spontaneous community quit rate estimated by others (Pechacek, cited in Flay, 1984). A study conducted after the ban was in place reported a 19% cessation rate in 423 Navy men one year after they graduated from recruit training (Hurtado & Conway, 1996). The authors concluded that the quit rate among those exposed to the smoking ban was sizably higher than a 6% spontaneous quit rate and comparable to one-year quit estimates reported across a variety of more costly cessation interventions.

The impact of the 8-week smoking ban can be compared to spontaneous cessation rates among civilians only with caution and appreciation for differences in study populations and settings. Burns and Pierce (1992) retrospectively assessed spontaneous cessation activity in Californians. Among adult females (18-65+ years of age), 12.5% of those who were smokers one year ago were non-smokers at the time of the interview. Others have reported somewhat similar adult cessation rates ranging from 8-10% (as cited in Zhu, Sun, Billings, and Choi, 1998). Naturally occurring quit rates among young people are generally thought to be as low or lower than adults' cessation rates, ranging from 0 to 11% over a 4 to 6 month period (Moss, Allen, Giovino, & Mills, 1992; Sussman, Lichtman, Ritt, & Pallonen, 1998). There is considerable variation in this estimate, with some studies reporting relatively high quit rates (22-33%) among daily, light high school smokers who self-initiated cessation (Hansen, Collins, Johnson, & Graham, 1985; Ershler, Levanthal, Fleming, & Glynn, 1989; Perry, Killen, Telch, Slinkard, & Danaher, 1980; Perry, Telch, Killen, Burke, & Maccoby, 1983). For the most part, however, research has reported low cessation rates for adolescents that range from 3-5% (Stanton, McClelland, Elwood, Ferry, & Silva, 1996; Zhu, Sun, Billings, & Choi, 1998). Cessation rates for young people in intervention studies vary greatly as well: participants 12 to 22

years of age in 14 programs reported quit rates ranging from 2% to 36%, with an overall quit rate of about 13% (Sussman, Lichtman, Ritt, & Pallonen, 1998).

Most of these investigations of cessation among civilians differ from the present study in one very important aspect: smokers in the comparison studies are usually individuals who are motivated to quit smoking. Those who self-initiate smoking cessation or volunteer to be part of a study as an intervention or control subject may be particularly motivated to change behavior. Navy women recruits did not voluntarily give up smoking; rather, smoking cessation during the eight weeks of training was mandatory. Few studies exist that include nonvolunteers to provide a comparison for the present results. An exception is a program developed by the American Lung Association (unpublished data cited in USDHHS, 1994) in which half of the participants were school-age smokers who were required to participate as a consequence of being caught smoking on school grounds. Nonvoluntary participation was thought partly to explain what the authors considered a low post-intervention cessation rate of 14%.

Smokers undergoing abrupt involuntary worksite smoking bans provide a somewhat appropriate comparison for participants in the present study, although worksite bans can only be enforced during working hours. Nonetheless, studies have shown that such restrictions can reduce the level of smoking among employees (Becker et al., 1989; Biener, Abrams, Follick, & Dean, 1989; Borland, Chapman, Owen, & Hill, 1990; Borland, Owen, & Hocking, 1991; Gottlieb et al., 1990; Millar, 1988; Petersen et al., 1988; Rosenstock, Stergachis, & Heaney, 1986), although positive effects on smoking cessation beyond what would occur naturally have not been consistently demonstrated (Sorensen et al., 1991; Borland, Owen, & Hocking, 1991; Biener, Abrams, Follick, & Dean, 1989).

Taken as a whole, comparisons among smokers in population studies, interventions, and work places with smoking restrictions suggest that the RTC smoking ban was moderately effective in helping smokers quit smoking. The 21% follow-up cessation rate among baseline past 30-day smokers is higher than expected had no ban been in place. Thus, restrictions on smoking during recruit training may provide smokers who desire to quit but have been unable to with an external impetus and support to quit. The recruit training smoking ban may have been most effective for casual smokers (i.e., experimenters), although appropriate comparison data are not available for these types of smokers. At least one study indicated that smoke-free work places are more likely to positively affect light and infrequent smokers than heavier smokers (Pierce et al., 1994).

One other benefit of the smoking ban during training is the probable effect on prevention of smoking initiation. A study conducted prior to the ban showed that a substantial number of male recruits who were non-smokers at entry to the Navy began to smoke during recruit training (Cronan, Conway, & Kaszas, 1991). Because the present study did not follow baseline non-smokers, however, this positive preventive effect cannot be assumed.

Although it is encouraging that at least some recruits did not return to smoking after recruit training, most did relapse. Results from the present study suggest that while recruits *stop* smoking during training, most are not *quitting* smoking. Although few settings exist that provide a comparable situation to the 8-week total smoking ban at RTC, pregnancy-related smoking cessation may provide a somewhat similar experience. A large percentage of pregnant women stop smoking during pregnancy, only to relapse post-partum. An estimated 21 to 30% of smokers stop smoking at some point during their pregnancy (Floyd, Rimer, Giovino, Mullen, & Sullivan, 1993; Ershoff, Quinn, & Mullen, 1995), yet 63-73% are likely to resume smoking within six months of delivery (Fingerhut, Kleinman, & Kendrick, 1990; Floyd et al., 1993; McBride, Pirie, & Curry, 1992; Mullen, Quinn, & Ershoff, 1990). As is the case with pregnant women, recruits may have stopped smoking, but their high relapse rate suggests that they may not have fully prepared themselves to quit. Like pregnancy, recruit training may be a type of imposed or external motivator that does not require attitude change or the use of cognitive and behavioral coping strategies that typically help people in their smoking cessation efforts (Stotts, DiClemente, Carbonari, & Mullen, 1996). Once the external motivator is removed (i.e., birth of the baby; graduation from recruit training), relapse is a likely outcome. Indeed, some believe that exogenous interventions (e.g., environmental smoking bans; safer cigarettes) only provide transient effects without concomitant efforts to enhance people's desire to be healthy (Wilde, 1986).

Reasons for the high rate of return to smoking may be the same as those that explain the increase in intentions to smoke among regular smokers (i.e., recruits' feelings of deprivation and loss of personal freedom during recruit training). Anecdotal reports from female Navy servicemembers recently graduated from recruit training confirm that many recruits look forward to "partying" once they leave recruit training and plan to indulge in behaviors prohibited during that time, although many expect to quit smoking "later." Another explanation may be that the first few months of Navy service after leaving RTC is stressful for some, who may smoke as a potential stress-reduction strategy.

The high relapse also can be explained in terms of behavioral principles (Skinner, 1953; Miller, 1980). There is high compliance with the no-smoking policy due to the authoritarian environment at RTC and the high probability of punishment for cheating against the policy (Hurtado & Conway, 1993). However, punishment (or the threat of punishment) does not cause behavior to be unlearned or forgotten, but only temporarily suppressed (Mowrer, 1960; Axelrod, 1983). After graduation, the reduction in barriers to smoke and the discontinuation of punishment may result in the reappearance of the smoking behavior, particularly if smoking had been followed by high levels of positive reinforcement prior to entering recruit training (Baldwin & Baldwin, 1986). Whereas individuals found smoking during recruit training could expect disciplinary action, once leaving recruit training the Navy environment might well be one that reinforces (or at least allows) smoking. Although the Navy has comprehensive policies in place that restrict smoking in work places, they are less prohibitive than the 24-hour-a-day no-smoking policy at RTC. In addition, the high rate of smoking among more senior

enlisted personnel, sanctioned smoke breaks, and reduced tobacco prices most likely provide cues to smoke once recruits leave RTC.

The phenomenon may be similar to the rebounding of smoking behavior among those who temporarily quit during an illness. People experience strongly aversive side effects from smoking when they have a cold or a prolonged attack of emphysema. Smoking makes both colds and emphysema even more aversive, thereby punishing acts of smoking as long as the smoker is sick. After the illness, there are fewer aversive side effects to smoking. In most cases, the behavior rebounds as individuals return to their previous high levels of smoking, even though they may have been abstinent for days or even weeks.

Relapse after leaving the restrictive environment at RTC also can be explained in terms of stimulus control. The narrow control of the recruits' behavior at RTC creates a potential for disruption of the behavior after leaving RTC. Once the verbal and nonverbal stimuli present at RTC that exclusively controlled smoking are no longer present, there is little generalization of the non-smoking behavior outside that context.

6. Correlates of Smoking Relapse

Univariate analyses of demographic, entry, and graduation correlates of relapse at the 3- and 12-month follow-ups yielded a number of significant predictors. Women who were younger, were White, were a more frequent type of smoker, were more addicted at entry, had greater intentions to smoke at entry and graduation, and still perceived themselves as smokers at graduation were more likely to be smoking three months after leaving RTC. However, when these variables were used in a multivariate model, only type of smoker at entry and perceptions of still being a smoker at graduation were predictive of relapse. At the 12-month follow-up, type of smoker and number of cigarettes smoked per day prior to entering the Navy were significant predictors of smoking behavior a year later.

In univariate analyses, several Navy-related factors were associated with relapse at the 3-month follow-up, a finding that may be of particular interest to Navy policy makers and program planners. Among occupational grouping, personnel assigned to Electronic Equipment (81%), Functional Support and Administration (72%), and Electrical/Mechanical Equipment (71%) showed the highest relapse rates. Among the lowest were Service and Supply (63%) and Medical/Dental (53%), although the number of women assigned to Service and Supply was small. To some degree, these findings correspond to a 1992 service-wide study of substance abuse and health behaviors among active-duty military personnel (Kroutil, Bray, & Marsden, 1994). Women in electronic equipment repair, functional support, and electrical/mechanical occupations were more likely to be smoking than women assigned to service and supply, although the findings did not consistently reach statistical significance.

A multivariate test controlling for age, education, and baseline smoking confirmed differences in smoking relapse by Navy occupation. Women working in Electronic

Equipment had statistically higher relapse rates than most other ratings. Medical/Dental personnel had the lowest relapse rates, encouraging news because enlisted personnel in this area historically have had high smoking rates, and the Navy has worked to reduce smoking among personnel in this specific area.

Smoking relapse also differed by whether the recruit had been assigned to an occupation generally thought of as a traditional or nontraditional one for women, with women working in nontraditional ratings having higher follow-up smoking rates. Research in the 1980s conducted by Thomas and colleagues (1982) suggested that Navy women in nontraditional ratings, as compared to women in traditional jobs, received less support from their supervisors and experienced more anxiety, although they were just as satisfied with their actual work. A considerable amount of literature links women's smoking with perceived job stress, and in fact, stress-related reasons were the primary ones women in the present study gave for returning to smoking once leaving RTC. It is important to note, however, that the Navy has changed greatly since the 1980s with many more occupations open to women. In the Thomas et al. study, 19% of the sampled women were assigned to nontraditional jobs compared to 64% in the present study.

The armed forces consider stress and its potential affects as an important health issue among women and men. A recent service-wide study estimates that one-third of military women experience high levels of stress, much of which is thought to be due to work and family role conflict, and simply from being women in a predominantly male military (Bray et al., 1995). Although the majority of military women report positive coping techniques, almost one-fourth report lighting up a cigarette to cope with stress (Bray et al., 1995). The present data, interpreted in light of previous studies, suggest that stress management techniques that address issues of coping in a male environment should be broadly disseminated to military women.

7. Intervention Effects

Many very interesting findings were found in this study regarding the smoking behavior of women entering the U.S. Navy and how smokers' behavior changed over their first year in the Navy. However, evaluation of the intervention effects proved very disappointing. Except for a weak trend for smokers in the "phone counseling" condition to have a slightly lower relapse rate during the first three months after graduating from RTC, no significant effects related to the interventions were found.

The "mail" intervention was a non-intrusive, passive health education intervention that was originally hypothesized to have a weaker effect than the more active phone intervention. However, we had expected the mail intervention to have some effect considering that it followed immediately after an 8-week period of exposure to a total smoking ban. We had hoped that recruits already in a "non-smoking mode" would be further affected by supportive reminders and encouraging notes received in the mail. This did not appear to happen.

The lack of an effect for the phone-counseling intervention was an even more surprising and disappointing finding. Similar telephone counseling available to California smokers who call to get help quitting smoking has been very successful. However, it must be noted that evaluations of the California telephone helpline are based on quitting successes among thousands of smokers who have voluntarily call for help on their own. Unfortunately, among our phone-counseling group of about one thousand "smokers" (including experimenters, light smokers, and former smokers), only 29 women ever called the helpline and only 5 of those completed the full counseling protocol.

Although incentives (e.g., a free phone calling card) and several mailed reminders about the availability of the helpline were provided to the women in the phone intervention group, clearly these did not motivate many smokers to make use of the helpline. The mailed reminders and simply the knowledge that the helpline was available may partially explain the weak trend for a lower smoking prevalence among the phone counseling group at the 3-month follow-up. However, this speculation cannot be confirmed; and, even if there were a weak initial effect within the first three months after leaving RTC, it was short-lived. It is unfortunate that more smokers were not motivated to take advantage of the helpline, as the California experience suggests that many of these smokers would have been successfully helped to become non-smokers.

B. Accomplishments and Challenges

This study was an extremely challenging one to conduct. First of all, researchers from San Diego, California had to collect data from women recruits entering the Navy and completing their initial training at Great Lakes, Illinois. This study would never have even gotten off the ground without the extraordinary help and cooperation of people at all levels at the Recruit Training Command and the Naval Training Center at Great Lakes. We were extremely impressed with the very professional and helpful interactions we had with all the Navy personnel at Great Lakes.

What appeared as challenges gathering data at Great Lakes soon paled as we were faced with tracking Navy women being transferred to commands literally all over the world. Again, help and cooperation from individuals at Source Data Systems (SDS), BUPERS, allowed us to track study participants to their first Navy command. Considering the short time frame to get the needed tracking information, SDS's help in providing reliable information in a timely manner was critical for conducting the study as designed with quick follow-up post RTC.

Similarly, our colleagues and co-investigators at the Naval Health Research Center (NHRC) in San Diego and the University of California, San Diego (UCSD) provided invaluable help and resources without which this study could not have been conducted as designed. NHRC colleagues provided data on personnel tapes that were essential for tracking participants transfers to different commands as well as other critical

demographic and attrition information. UCSD colleagues provided the phone-counseling intervention, which would have been virtually impossible to include without their expertise. The help, information, and collegial interactions provided by both our NHRC and UCSD co-investigators were invaluable, and the study could not have been completed without them.

This very challenging field experiment was completed successfully because of the great team efforts involving both university researchers and a whole host of Department of the Navy personnel. Rigorous evaluation efforts, unfortunately, indicated no significant effects of the two interventions being tested to reduce smoking among Navy women during their first year in the service. However, this study has provided other very useful information regarding the smoking behavior of women recruits entering the Navy, effects of the 8-week smoke-free ban at RTC on relapse rates after leaving the RTC environment, and various other information on smoking behavior (including prospective predictors of smoking) during Navy women's first year in the service. Hopefully, the findings presented in this final report on "Operation Stay Quit" will provide useful information for developing new efforts to help more Navy personnel become smoke-free. Further efforts to help the Navy reach its goal of being smoke-free by the year 2010 will clearly enhance overall health and physical readiness and produce a fitter force.

IV. References

Allen, K, Moss, A, Giovino, GA, Shopland, DR, & Pierce, JP. (1993). Teenage tobacco use data. Estimates from the teenage attitudes and practices survey, United States, 1989. Advance Data. US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics, No. 224.

Axelrod, S. (1983). Introduction. In S Axelrod & J Apsche (Eds.), The effects of punishment on human behavior. New York: Academic Press.

Bachman, JG, Wallace, JM, O'Malley, PM, Johnston, LD, Kurth, CI, & Neighbors, HW. (1991). Racial/ethnic differences in smoking, drinking, and illicit drug use among American high school seniors, 1976-89. American Journal of Public Health, 81, 372-377.

Baldwin, JD, & Baldwin, JI. (1986). Behavior principles in everyday life. Englewood Cliffs, NJ: Prentice-Hall.

Baumeister, RF, Heatherton, TF, & Tice, DM. (1994). Losing Control: How and why people fail at self-regulation. San Diego: Academic Press.

Becker, DM, Conner, HF, Waranch, HR, Stillman, F, Pennington, L, Lees PS, & Oski, F. (1989). The impact of a total ban on smoking in the Johns Hopkins Children's Center. Journal of the American Medical Association, 262(6), 799-802.

Biener, L, Abrams, DB, Follick, MJ, & Dean, L. (1989). A comparative evaluation of a restrictive smoking policy in a general hospital. American Journal of Public Health, 79(2), 192-195.

Blake, SM, Klepp, KI, Pechacek, TF, et al. (1989). Differences in smoking cessation strategies between men and women. Addictive Behaviors, 14 409-418.

Borland, R, Chapman, S, Owen, N, & Hill, D. (1990). Effects of workplace smoking bans on cigarette consumption. American Journal of Public Health, 80(2), 178-180.

Borland, R, Owen, N, & Hocking, B. (1991). Changes in smoking behavior after a total workplace smoking ban. Australian Journal of Public Health, 15(2), 130-134.

Bray, RM, Kroutil, LA & Marsden, ME. (1995). Trends in alcohol, illicit drug use, and cigarette use among U.S. military personnel: 1980-1992. Armed Forces and Society, 21, 271-293.

Bray, RM, Kroutil, LA, Wheelless, SC, Marsden, ME, Bailey, SL, et al. (1995). 1995 Department of Defense Survey Among Military Personnel (Report No. RTI/6019/06-FR). Research Triangle Park, NC: Research Triangle Institute.

Bray, RM, Marsden, ME, & Peterson, MR. (1991). Standardized comparisons of the use of alcohol, drugs, and cigarettes among military personnel and civilians. American Journal of Public Health, 81(7), 865-869.

Burns, D, & Pierce, J. (1992). Tobacco use in California 1990-1991. Sacramento: California Department of Health Services.

Centers for Disease Control and Prevention (CDC). (1987). Cigarette smoking in the United States, 1986. Morbidity and Mortality Weekly, 36, 581-585.

Centers for Disease Control and Prevention (CDC). (1991a). Cigarette smoking among adults—United States, 1988. Morbidity and Mortality Weekly, 40, 757-765.

Centers for Disease Control and Prevention (CDC). (1991b). Differences in the age of smoking initiations between blacks and whites—United States. Morbidity and Mortality Weekly, 40, 754-757.

Centers for Disease Control and Prevention (CDC). (July 9, 1993). Smoking cessation during previous year among adults—United States, 1990 and 1991. Morbidity and Mortality Weekly, 504-506.

Centers for Disease Control and Prevention (CDC). (1994). Cigarette smoking among women of reproductive age—United States, 1987-1992. Morbidity and Mortality Weekly, 43(43), 789-797.

Centers for Disease Control and Prevention (CDC). (1997). State-specific prevalence of cigarette smoking among adults, and children's and adolescent's exposure to environmental tobacco smoke—United States, 1996. Morbidity and Mortality Weekly, 1038-1043.

Chassin, L, Presson, CC, & Sherman, SJ. (1989). "Constructive" vs. "destructive" deviance in adolescent health-related behaviors. Journal of Youth and Adolescence, 18(3), 345-262.

Chief of Naval Operations (CNO), OPNAVINST 6110.1D, Physical Readiness Program, Jan 18, 1990.

Clayton, S. (1991). Gender differences in psychosocial determinants of adolescent smoking. Journal of School Health, 6, 115-120.

Conrad, KM, Flay, BR, & Hill, D. (1992). Why children start smoking cigarettes: Predictions of onset. British Journal of Addiction, 87(12), 1711-1124.

Conway, TL, & Cronan, TA. (1992). Smoking, exercise, and physical fitness. Preventive Medicine, 21(6), 723-734.

Conway, TL, & Cronan, TA. (1988). Smoking and physical fitness among Navy shipboard personnel. Military Medicine, 153(11), 589-594.

Conway, TL, Trent, L, & Conway, SW. (1989). Physical readiness and lifestyle habits among U.S. Navy personnel during 1986, 1987, and 1988 (Report No. 89-24). San Diego, CA: Naval Health Research Center.

Cronan, TA, Conway, TL & Hervig, LK. (1989). Evaluation of smoking interventions in recruit training. Military Medicine, 154(7), 371-375.

Cronan, TA, Conway, TL & Kaszas, SL. (1991). Starting to smoke in the Navy: When, where and why. Soc Sci Med, 33, 1349-1353.

Department of Defense, DoDINST 1010.15, Smoke-Free Workplace, March 7, 1994.

Eberhart, JJ, & Socrides, CW. (1953). Psychiatric selection of women for Naval service. U.S. Armed Forces Medical Journal, 4, 995-1002.

Ernster, V. (1985). Mixed messages for women: A social history of cigarette smoking and advertising. New York State Journal of Medicine, 85, 335-340.

Ershler, J, Levanthal, H, Fleming, R, & Glynn, K. (1989). The quitting experience for smokers in sixth through twelfth grade. Addictive Behaviors, 14, 365-378.

Ershoff, DH, Quinn, VP, & Mullen, P D. (1995). Relapse prevention among women who stop smoking early in pregnancy: A randomized clinical trial of a self-help intervention. American Journal of Preventive Medicine, 11(3), 178-184.

Farkas, AJ, Pierce, JP, Zhu S-H, Rosbrook, B, Gilpin, EA, Berry, C et al. (1996). Addiction versus stages of change models in predicting successful smoking cessation in California. Addictions, 91(9), 1271-1280.

Fingerhut, L. A, Kleinman, J C, & Kendrick, JS. (1990). Smoking before, during, and after pregnancy. American Journal of Public Health, 80, 541-544.

Fiore, MC, Novotny, TE, Pierce, JP, Hatziandreu, EJ, Patel, KM, & Davis, RM. (1989). Trends in cigarette smoking in the United States: The changing influences of gender and race. Journal of the American Medical Association, 261, 49-55.

Floyd, RL, Rimer, BK, Giovino, GA, Mullen, PD, & Sullivan, SE. (1993). A review of smoking in pregnancy: Effects on pregnancy outcomes and cessation efforts. Annual Review of Public Health, 14, 379-411.

Fried, JL. (1994). Women and young girls . . . high-risk populations for tobacco use. Health Values, 18(1), 33-40).

Geronimus, AR, & Korenman, S. (1993). Maternal youth or poverty? On the health disadvantages of infants with teen mothers. American Journal of Epidemiology, 137, 213-235.

Geronimus, AR, Neider, LJ, & Bound, J. (1993). Age patterns of smoking in U.S. Black and White women of childbearing age. American Journal of Public Health, 83(9), 1258-1264.

Gottlieb, NH, Eriksen, MP, Lovato, CY, Weinstein, RP, & Green, LW. (1990). Impact of a restrictive work site smoking policy on smoking behavior, attitudes, and norms. Journal of Occupational Medicine, 32(1), 16-23.

Gritz, ER, Brooks, L, & Nielson, I. (1995). Gender differences in smoking cessation. In K. Slama (ED.). Tobacco and Health. Plenum Press, New York.

Gritz, ER, & Jarvik, ME. (1978). Nicotine and smoking. In L.L. Iverson, S.D. Iverson, & S.H. Snyder (Eds.), Handbook of Psychopharmacology, 11, 426-464. New York: Plenum Press.

Gruder, CL, Mermelstein, RJ, Kirkendol, S, et al. (1993). Effects of social support and relapse prevention training as adjuncts to a televised smoking-cessation intervention. Journal of Consulting and Clinical Psychology, 61(1), 113-120.

Grunberg, NE, Winders, SE, & Wewers, ME. (1991). Gender differences in tobacco use. Health Psychology, 10(2), 143-153.

Guilford, JS. (1967). Sex Differences between successful and unsuccessful abstainers from smoking. In Sagon, S.V. (ed.), Studies and Issues in Smoking Behavior, University of Arizona Press, Tucson, 95-102.

Gunby, P. (1996). Tobacco recruiting may precede that of military [Medical News and Perspectives]. Journal of the American Medical Association, 275(16), 1219.

Hansen, WB, Collins, LM, Johnson, CA, & Graham, JW. (1985). Self-initiated smoking cessation among high school students. Addictive Behaviors, 10(3), 265-272.

Hansen, WB, Collins, LM, Malotte, DK, Johnson, CA, & Fielding, JE. (1985). Attrition in prevention research. Journal of Behavioral Medicine, 8, 261-275.

Headen, SW, Bauman, KE, Deane GD, & Koch, GC. (1991). Are the correlates of smoking initiation different for Black and White adolescents? American Journal of Public Health, 81, 854-858.

Hibbard, JH. (1993). Social roles as predictors of cessation in a cohort of women smokers. Women and Health, 20(4), 71-80.

Horn, EL. (1965). The problems associated with the retention of young enlisted women in the U.S. Navy. Monterey, CA: Naval Postgraduate School.

Howe, HL. (1983). Advertising and women's changing smoking habits: A historical perspective. In W.F. Forbes, R.C. Freckor, & D. Nostbakkan (Eds.), Proceedings of the Fifth World Congress on Smoking and Health, 1, 319-330. Ottawa: Canadian Council on Smoking and Health.

Hurtado, SL, & Conway, TL. (1991). Changes in male and female recruits' smoking behavior following a strict no-smoking policy in U.S. Navy recruit training. Unpublished raw data.

Hurtado, SL, & Conway, TL. (1993). Changes in smoking behavior following a strict no-smoking policy in U.S. Navy recruit training (Technical report no. 93-17). San Diego, CA: Naval Health Research Center.

Hurtado, SL, & Conway, TL. (1996). Changes in smoking behavior following a strict no-smoking policy in U.S. Navy recruit training. Military Medicine, 161(10).

Kabat, GC, & Wynder, EL. (1987). Determinants of quitting smoking. American Journal of Public Health, 77, 1301-1305.

Kalton, G. (1968). Standardization: A technique to control for extraneous variables. Applied Statistics, 23, 118-136.

Killen, JD, Robinson, TN, Haydel, KF, Hayward, C, Wilson, DM, Hammer, LD, Litt, IF, & Taylor, CB. (1997). Prospective study of risk factors for the initiation of cigarette smoking. Journal of Consulting and Clinical Psychology, 65(6), 1011-1016.

Kroutil, LA, Bray, RM, & Marsden, ME. (1994). Cigarette smoking in the U.S. military: Findings from the 1992 Worldwide Survey. Preventive Medicine, 23, 521-528.

Lacey, LP, Manfredi, C, Balch, G, et al. (1993). Social support in smoking cessation among black women in Chicago public housing. Public Health Reports, 108(3), 387-394.

Leventhal, H, Fleming, R, & Glynn, K. (1988). A cognitive-developmental approach to smoking intervention. In S Maes, CD Spielberger, PB Defares, & IG Sarason (Eds.), Topics in health psychology: Proceedings of the first annual expert conference in health psychology. New York: John Wiley & Sons.

Marcus, BH, Albrecht, AE, Niaura, RS, et al. (1991). Usefulness of physical exercise for maintaining smoking cessation in women. The American Journal of Cardiology, 68, 406-407.

- Marlatt, GA, & Gordon, JR. (1985). *Relapse prevention: Maintenance strategies in the treatment of addictive behavior*. New York: Guilford Press.
- McBride, CM, Pirie, PL, & Curry, SJ. (1992). Postpartum relapse to smoking: A prospective study. Health Education Research, 7, 381-390.
- Millar, WJ. (1988). Evaluation of the impact of smoking restrictions in a government work setting. Canadian Journal of Public Health, 79, 379-382.
- Miller, LK. (1980). Principles of everyday behavior analysis. Monterey, CA: Brooks/Cole.
- Moss, AJ, Allen, KF, Giovino, GA, & Mills, SL. (1992). Recent trends in adolescent smoking, smoking-uptake correlates, and expectations about the future. Advance Data. US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics, No. 221.
- Mowrer, OH. (1960). Learning theory and behavior. New York: John Wiley.
- Mullen, PD, Quinn, VP, & Ershoff, DH. (1990). Maintenance of nonsmoking postpartum by women who stopped smoking during pregnancy. American Journal of Public Health, 80, 992-994.
- O'Connell, K. (1990). Smoking cessation: Research on relapse crisis. Annual Review of Nursing Research, 8, 83-100.
- O'Loughlin, J, Paradis, G, Renaud, L, Meshefedjian, G, & Barnett, T. (1997). The "Yes I Quit" smoking cessation course: Does it help women in a low income community quit? Journal of Community Health, 22(6), 451-468.
- Ossip-Klein, DJ, Giovino, GA, Megahed, N, et al. (1991). Effects of a smokers' hotline: Results of a 10-county self-help trial. Journal of Consulting and Clinical Psychology, 59, 325-332.
- Pachacek, T. as cited in Flay, RP. (1984). Mass media and smoking cessation: A critical review. American Journal of Public Health, 77(2), 153,160.
- Perkins, KA, Epstein, LH, & Paster, S. (1990). Changes in energy balance following smoking cessation and resumption of smoking in women. Journal of Consulting and Clinical Psychology, 58(1), 121-125.
- Perkins, KA. (1996). Sex differences in nicotine versus nonnicotine reinforcement as determinants of tobacco smoking. Experimental and Clinical Psychopharmacology, 4, 1-12.

Perry, CL, Killen J, Telch, M, Slinkard, LA, & Danaher, BG. (1980). Modifying smoking behavior of teenagers: A school-based intervention. American Journal of Public Health, 70(7), 722-725.

Perry, CL, Telch, MJ, Killen, J, Burke, A, & Maccoby, N. (1983). High school smoking prevention: The relative efficacy of varied treatment and instructors. Adolescence, XVIII(71), 561-566.

Petersen, LR, Helgerson, SD, Gibbons, CM, Calhoun, CR, Ciacco, KH, & Pitchford, KC. (1988). Employee smoking behavior changes and attitudes following a restrictive policy on worksite smoking in a large company. Public Health Reports, 103(2), 115-120.

Pierce, JP, Fiore, MC, Novotny, TE, et al. (1989). Trends in cigarette smoking in the United States: Projections to the year 2000. Journal of the American Medical Association, 261, 61-65.

Pierce, J.P., Evans, N., Farkas, A.J., Cavin, S.W., Berry, C., Kramer, M., et al. (1994). *Tobacco Use in California. An Evaluation of the Tobacco Control Program, 1989-1993*. San Diego, CA.

Pirie, PL, Murray, DM, & Luepker, RV. (1991). Gender differences in cigarette smoking and quitting in a cohort of young adults. American Journal of Public Health, 81(3), 324-327.

Plog, SC, & Kahn, OI. (February, 1974). Re-enlistment and retention of effective women in the Women's Army Corps: an exploratory research investigation (RM 74-3). Arlington, VA: Army Research Institute.

Pokorski, TL. (1992). Effect of prevention education on smoking relapse for Navy recruits. Doctoral dissertation.

Remington, PL, Forman, MR, Gentry, EM, et al. (1985). Current smoking trends in the United States: The 1981-1983 Behavioral Risk Factor Surveys. Journal of the American Medical Association, 253, 2975-2978.

Rosenstock, IM, Stergachis, A, & Heaney, C. (1986). Evaluation of smoking prohibition policy in a health maintenance organization. American Journal of Public Health, 76(8), 1014-1015.

Secretary of the Navy, SECNAVINST 5100.13A, Tobacco Prevention Program in the Navy and Marine Corps, July 17, 1986.

Skinner, BF. (1953). Science and Human Behavior. New York: Macmillan.

Sorensen, G, & Pechacek, TF. (1987). Attitudes toward smoking cessation among men and women. Journal of Behavioral Medicine, 10(2), 129-137.

Sorensen, G, Rigotti, N, Rosen, A, Pinney, J, & Prible, R. (1991). Effects of a worksite no-smoking policy: Evidence for increased cessation. American Journal of Public Health, 81(2), 202-204.

Stanton, WR, Lowe, JB, & Gillespie, AM. (1996). Adolescents' experiences with smoking cessation. Drug and Alcohol Dependence, 43, 63-70.

Stanton, WR, McClelland, M, Elwood, C, Ferry, D, & Silva, PA. (1996). Prevalence, reliability and bias of adolescents' reporting of smoking and quitting. Addiction, 91(11), 1705-1714.

Stotts, AL, DiClemente, CC, Carbonari, JP, & Mullen, PD. (1996). Pregnancy smoking cessation: A case of mistaken identity. Addictive Behaviors, 21(4), 459-471.

Sussman, S, Lichtman, K, Ritt, A, & Pallonen, U. (1998). Effects of thirty four adolescent tobacco use cessation and prevention trails on regular users of tobacco products. Manuscript submitted for publication.

Thomas, PJ. (March, 1977). Why women enlist: The Navy as an occupational choice (Technical report no. 77-20). San Diego, CA: Navy Personnel Research and Development Center.

U.S. Department of Health and Human Services. The Health Consequences of Smoking for Women: A report of the Surgeon General. Washington, DC: Public Health Service, U.S. Government Printing Office, 1979.

U.S. Department of Health and Human Services. Reducing the Health Consequences of Smoking: Nicotine Addiction: A report of the Surgeon General. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1994.

U.S. Department of Health and Human Services. Preventing Tobacco Use among Young People: A Report of the Surgeon General. DHHS Publication No.(CDC) 88-8406, Washington, DC: Government Printing Office, 1988.

Weaver, KB, Woodruff, S, Conway, TL, Edwards, CC, Zhu, S-H, & Elder, JP. (1998). Does the U.S. Navy attract young women who smoke? Manuscript submitted for publication.

Wilde, GJS. (1986). Beyond the concept of risk homeostasis: Suggestions for research and application towards the prevention of accidents and lifestyle-related disease. Accident Analysis and Prevention, 18(5), 377-401.

Zhu, S-H, & Pierce, JP. (1995). A new scheduling method for time-limited counseling. Professional Psychology: Research and Practice, 6, 624-625.

Zhu, S-H, Sun, J, Billings, S, & Choi, WS. (1998). Predictors of smoking cessation in U.S. adolescents. Manuscript submitted for publication.

V. Appendices

- A. Mail Intervention Modules – 1-6b**
- B. Surveys – Entry, Graduation, 3-, 6-, 12-Month**
- C. Publications, Manuscripts, Abstracts**

Appendix A

Mail Intervention Modules
(1 – 6b)

To Smoke or Not To Smoke?

Tips for Being a Nonsmoker

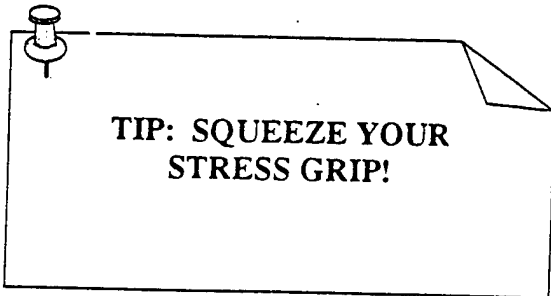
Delay: Look at your watch & wait 2 or 3 minutes. The urge to smoke will fade or go away.

Deep Breathing: Breathe in slowly & deeply. Hold your breath & count to 5.

Drink Water: Water helps satisfy the need to put something in your mouth & it's good for you. Jazz it up with a lemon or orange slice & use a straw.

Distraction: Whatever you are doing when the urge to smoke strikes you, immediately do something else! Call a friend, stand up if you were sitting, chew a piece of gum.

Watch Out! One of the biggest dangers you face is alcohol. Drinking and smoking seem to go hand in hand for many people. If you do drink, be prepared for cigarette cravings. Decide in advance how you will handle these cravings. Tell the people you are with that you don't want to smoke; keep pretzels, popcorn, toothpicks or straws handy to give your hands something to do.



**TIP: SQUEEZE YOUR
STRESS GRIP!**

OPERATION STAY QUIT

Ship Shape

As a woman in the Navy, staying in shape is particularly important to you. Many women are afraid they will gain weight once they quit smoking. Some people do gain a few pounds because their metabolism slows down to a more normal pace, but any weight gain is often just temporary. Look below for hints on how to stay fit & smoke free!

Hints for Staying Fit:

- Snack on pretzels instead of potato chips
- Read labels to find low-fat & non-fat food
- Drink lots of water
- Spend an extra 10 minutes in the gym
- Go for a walk



***TIP: KEEP SUGAR-FREE
GUM HANDY TO SATISFY
THOSE CRAVINGS!***

What's In It For You?

Benefits of Not Smoking

*Smoke 1 pack a week?
In 1 month you could buy...*

- 3 deli sandwiches
- or
- 4 lunches at McDonalds
- or
- 4 People magazines
- or
- 8 video rentals

*Smoke 1 pack a day?
In 1 month you could buy...*

- 7 pizzas
- or
- 8 movie tickets
- or
- 15 long distance phone calls
- or
- jeans & a t-shirt

**TIP: CALCULATE HOW
MUCH EXTRA MONEY
YOU HAVE TO SPEND
WHEN YOU DON'T BUY
CIGARETTES!**

OPERATION STAY QUIT

It Takes Time...

Quitting cigarettes for good is a process that takes time. It took a while to become a smoker, so it makes sense that it can take a while to become a nonsmoker. If negative thoughts creep in, use the “3 Rs” to keep you on track:

REMIND
yourself of why you
are quitting.

REHEARSE
difficult situations
before they
happen.

REFUSE
to let negative
thoughts take
control.

**TIP: USE YOUR NEW
PEN TO WRITE DOWN
WHAT YOU CAN DO
INSTEAD OF
SMOKING!**

OPERATION STAY QUIT

Need Help?

The support of your family, friends & co-workers is a big help when you're trying not to smoke. Let others know HOW to help you. Be specific - try out some of the ideas below.

Tell others what you might want to do instead of smoking so they know what to suggest when you need a boost.

Remind others to be positive!
A friend can help by saying,
"You've had a tough week & it's great that you haven't smoked. Let's go to the gym to get rid of some of your stress."


Rehearse difficult situations with a friend so you can be prepared for when you might feel tempted.

TIP: USE YOUR ADDRESS BOOK TO KEEP A FRIEND'S PHONE NUMBER HANDY!

OPERATION STAY QUIT

CONGRATULATIONS! YOU ARE A NONSMOKER!

If you have made it this long without smoking, you are well on your way to being a nonsmoker for life. Even if you've slipped, you've learned valuable lessons about how to stay away from tempting situations. You may still face some difficult moments, so be on the look out! When faced with an unexpected problem or situation, remind yourself that smoking won't solve your problem. Think of the different ways you've handled stress or boredom in the past and use them!



**TIP: LOOK IN YOUR MIRROR.
YOU HAVE CHANGED THE WAY
YOU THINK ABOUT YOURSELF.
YOU'RE LOOKING AT A
NONSMOKER NOW!**

OPERATION STAY QUIT

Still Smoking?

"I feel sick when I don't smoke..."

You aren't sick, but you are experiencing withdrawal symptoms. Those symptoms will pass within a week or two.

"I'll just smoke less, or switch to low tar cigarettes..."

Sorry, doesn't work. You'll either smoke more to get the nicotine, or creep back up to your old level of smoking.

"I'll gain weight if I quit smoking..."

Possibly, but often post-quitting weight gain is temporary. Increasing your physical activity and snacking on low-fat foods will keep you fit.

Do these sound familiar? Read on...

"Quitting is just too hard..."

Quitting can be hard, but over 40 million Americans have quit, including 13 million heavy smokers. Some people quit on their first try and others have to try several times. Just a few weeks after quitting your lungs work 30% better. Within a year your risk of smoking-related disease is cut in half.

It's never too late - do it now!

**TIP: LOOK IN YOUR MIRROR
AND PICTURE A
NONSMOKER!**

OPERATION STAY QUIT

Appendix B

Surveys

Entry, Graduation, 3-, 6-, 12-Month

Entry Survey

**Improving Navy Women's Health:
Preventing Smoking Relapse After Recruit Training**

San Diego State University
Graduate School of Public Health
Center for Behavioral and Community Health Studies
9245 Sky Park Court, Suite 120, San Diego, CA 92123

COMMITTEE ON PROTECTION OF
HUMAN SUBJECTS

APPROVED BY: Cal
EXPIRES: 9/27/96
SAN DIEGO STATE UNIVERSITY

INFORMED CONSENT AGREEMENT

You are being asked to participate in a research study. Before you give your consent to be a volunteer, it is important that you read the following information and ask as many questions as necessary to be sure you understand what you will be asked to do.

Investigators

This research is being conducted by Dr. Terry Conway, Dr. John Elder, and Ms. Susan Woodruff from the Graduate School of Public Health at San Diego State University, by Dr. Shu-Hong Zhu of the University of California, San Diego, and by Ms. Linda Hervig and Ms. Suzanne Hurtado from the Naval Health Research Center, San Diego.

Purpose of the Study

This research is being conducted to better understand tobacco use among women entering the Navy.

Description of the Study

If you decide to participate, you will be asked to provide information about your use of tobacco and some background information in a brief survey at the beginning and end of recruit training. You may be given some information near the end of recruit training about a quit-smoking helpline. After graduation, you may receive some mailed materials about quitting smoking. You might also be asked to complete 3 other brief surveys mailed to you during the following year. Each of the surveys should only take 10-15 minutes to complete. The duration of your participation could potentially range from 8 weeks of recruit training to 1 year after graduation. You will be sent a summary of the findings if you wish.

What is Experimental About This Study

None of the procedures or surveys used in this study are experimental in nature. The only experimental aspect of this study is the gathering of information for the purpose of statistical analysis.

Risks or Discomforts

The only slight potential risk involved in participating in this study is that you may feel some anxiety or discomfort answering survey questions about your smoking status. If you begin to feel uncomfortable while filling out the survey, you may refuse to answer any question that disturbs you, or you may discontinue your participation in the study, either temporarily or permanently.

Benefits of the Study

Some participants will receive lottery prizes or small tokens of appreciation for participating in the study and completing the surveys. If you are a smoker and quit, potential benefits to you personally could include increased physical fitness and better health, although we cannot guarantee that you will experience these benefits from participating in the study. In addition, the information gained from this research on women entering the Navy may benefit other women in the military.

Confidentiality

All data and medical information obtained about you as an individual will be considered privileged and held in confidence; you will not be identified in any presentation of the results. Complete confidentiality cannot be promised, particularly to subjects who are military personnel, because information bearing on your health may be required to be reported to appropriate medical or command authorities. However, in the present study, no information will be collected from you that is sensitive or potentially embarrassing.

Participant: initial and date to indicate that you have read this page _____

Witness: initial and date to indicate that the participant has read this page _____

**Improving Navy Women's Health:
Preventing Smoking Relapse After Recruit Training**

San Diego State University
Graduate School of Public Health
Center for Behavioral and Community Health Studies
9245 Sky Park Court, Suite 120, San Diego, CA 92123

**COMMITTEE ON PROTECTION OF
HUMAN SUBJECTS**

APPROVED BY: Car
EXPIRES: 9/27/96
SAN DIEGO STATE UNIVERSITY

Confidentiality (cont)

It is the policy of the funding agency, the U.S. Army Medical Research and Materiel Command (USAMRMC), that data sheets be completed on all volunteers participating in research for entry into their Volunteer Registry Database. The information entered in this confidential database will include your name, address, Social Security Number, and the name and dates of this study. The purpose of the database is to answer any questions that may arise concerning a person's participation in the research, and to ensure that participants are adequately warned of risks. Representatives of the USAMRMC are eligible to review research records as part of their responsibility to protect human subjects in research. The information in the database will be stored for a minimum of 75 years. The information stored in the USAMRMC database is confidential.

Voluntary Nature of Participation

Participation in this study is voluntary. Your decision on whether to participate will not prejudice your future relations with San Diego State University or the U.S. Navy. If you decide to participate, you are free to withdraw your consent and discontinue your participation at any time without penalty or loss of benefits to which you are otherwise entitled.

Questions About the Study

If you have any questions about the research now, please ask. If you have questions later about the research and/or research-related injuries, you may contact Dr. Terry L. Conway, 9245 Sky Park Court, Suite 120, San Diego, CA 92123, (619) 594-8044.

If you have questions regarding your rights as a human subject and participant in this study, you may call the office of the Committee on Protection of Human Subjects at San Diego State University for information. The telephone number of the Committee is (619) 594-6622. You may also write to the following address:

Committee on Protection of Human Subjects
San Diego State University
5500 Campanile Drive
San Diego, CA 92182-1643

This consent form has been approved by the Committee on Protection of Human Subjects at San Diego State University, as signified by the Committee's stamp. The consent form must be reviewed annually and expires on the date indicated on the stamp.

You are authorized all necessary medical care for injury or illness that might result from participation. Other than medical care that may be provided, there is no other compensation for injury or illness. However, this is not a waiver or release of your legal rights.

Your signature below indicates that you have read the information above and have had a chance to ask any questions you have about the study. You agree to be in the study and have been told that you can change your mind and withdraw your consent to participate at any time. You have been given a copy of this form. You have been told that by signing this consent form you are not giving up any of your legal rights.

Printed Name of Subject	Signature of Subject	Date
<hr/>		
Printed Address of Subject	SSN of Subject	
<hr/>		
Printed Name of Witness	Signature of Witness	Date
<hr/>		
Signature of Investigator		Feb. 21, 1996
		Date

RTC ENTRY SURVEY

Dear Participant:

You and several hundred other new members of the U.S. Navy have been selected to participate in this survey. Your answers will assist researchers at San Diego State University, Naval Health Research Center, and the University of California, San Diego to study tobacco use among new Navy members. Your participation is very important because the information you provide will help guide future health programs for Navy personnel.

Please answer all the questions honestly and to the best of your ability. Your responses are for research use only and will be kept confidential. Data will be reported so that no individual participant can be identified. If you have any questions about this survey, please contact Dr. Terry L. Conway, San Diego State University, Graduate School of Public Health, 9245 Sky Park Court, Suite 120, San Diego, CA 92123/Phone: (619) 594-8044.

Thank you for your cooperation in this project.

Privacy Act Statement

(1) Authority: Authority to request information is granted under Title 5 USC 301, Department of the Navy Regulations, and Executive Order 9396. License to administer this survey is granted under OPNAV Report Control Symbol 6100-11 which expires 30 June 1998. Personal identifiers will be used to conduct follow-on research. (2) Purpose: The purpose of this survey is to collect data about tobacco use among new Navy members. (3) Routine Use(s): Information provided in this survey will be analyzed by San Diego State University. The data files will be maintained by San Diego State University and the Navy Personnel Survey System at the Navy Personnel Research and Development Center, where they will be used for determining changing trends in the Navy. (4) Anonymity: All responses will be held in confidence by San Diego State University. Information you provide will be considered only when statistically summarized with the responses of others and will not be attributable to any single individual. (5) Participation: Completion of this survey is entirely voluntary. Failure to respond to any of the questions will NOT result in any penalties except lack of representation of your views in the final results and outcomes.

IMPORTANT INSTRUCTIONS

- * **USE NO. 2 PENCIL ONLY.**
- * **Do NOT use ink, ballpoint, or felt tip pens.**
- * **Erase cleanly and completely any changes you make.**
- * **Make black marks that fill the circle.**
- * **Do NOT make any stray marks on the form.**

WHEN APPLICABLE:

- *Write the numbers in the boxes at the top of the block.
*Fill in the corresponding circles below.

Please answer ALL questions. Mark NA if not applicable to you. Provide only one answer for each question.

ABOUT YOU...

Name: _____
Last First MI

Social Security Number:

[illegible]

Training Information:

DIVISION			SHIP		
0	0	0	0	0	
1	1	1	1	1	
2	2	2	2	2	
3	3	3	3	3	
4	4	4	4	4	
5	5	5	5	5	
6	6	6	6	6	
7	7	7	7	7	
8	8	8	8	8	
9	9	9	9	9	

Today's date:

DATE					
MO.		DAY		YR.	
0	0	0	0	0	0
1	1	1	1	1	1
	2	2	2	2	2
	3	3	3	3	3
	4	4	4	4	4
	5	5	5	5	5
	6	6	6	6	6
	7	7	7	7	7
	8	8	8	8	8
	9	9	9	9	9

PLEASE DO NOT WRITE IN THIS AREA

7906

SMOKING HISTORY

1. Have you smoked 100 cigarettes (5 packs) in your entire life?
☐ No
☐ Yes
2. At what age did you first start smoking fairly regularly?
☐ NA - have never smoked regularly
☐ Under 12 yrs old
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18
☐ 19
☐ 20
☐ 21 yrs old or older
3. When was the last time you smoked a cigarette?
☐ NA - have never smoked
☐ The day I arrived at recruit training
☐ 1-7 days before recruit training
☐ 8-29 days before recruit training
☐ 1-3 months ago
☐ 4-6 months ago
☐ 7-11 months ago
☐ 1-4 years ago
☐ 5 or more years ago
4. Prior to recruit training, did you smoke cigarettes every day or some days?
☐ NA - did not smoke prior to recruit training
☐ Every day
☐ Some days
5. During the 30 days prior to recruit training, how many cigarettes did you smoke on a typical day when you smoked cigarettes?
☐ NA - did not smoke any cigarettes in the last 30 days
☐ Less than 1 cigarette on average
☐ 1-5 cigarettes
☐ 6-10 cigarettes
☐ 11-15 cigarettes
☐ 16-20 cigarettes
☐ 21-25 cigarettes
☐ 26-30 cigarettes
☐ 31-35 cigarettes
☐ 36-40 cigarettes
☐ More than 40 cigarettes
6. During the 30 days prior to recruit training, how soon after waking up would you usually smoke your first cigarette?
☐ NA - did not smoke prior to recruit training
☐ Immediately after waking up
☐ Within 15 minutes after waking up
☐ 15-30 minutes after waking up
☐ 31-60 minutes after waking up
☐ 61 minutes-2 hours after waking up
☐ More than 2 hours after waking up
7. How would you describe yourself prior to recruit training?
☐ Never smoked
☐ Experimented with smoking
☐ Occasional smoker
☐ Daily smoker
☐ Former smoker

QUIT ATTEMPTS

8. Before recruit training, had you ever tried to quit smoking?
☐ NA - have never smoked
☐ No
☐ Yes

9. Before recruit training, when was the last time you tried to quit smoking?
☐ NA - have never smoked
☐ Have never tried to quit
☐ 1-7 days before recruit training
☐ 8-29 days before recruit training
☐ 1-3 months before recruit training
☐ 4-6 months before recruit training
☐ 7-11 months before recruit training
☐ 1-4 years before recruit training
☐ 5 or more years before recruit training
10. Considering the last time you tried to quit smoking during the past 12 months, how long did you stay quit? (Do not count recruit training.)
☐ NA - did not smoke in the past 12 months
☐ Did not try to quit in the past 12 months
☐ Less than 24 hours
☐ 1 day
☐ 2-7 days
☐ 8-29 days
☐ 1-3 months
☐ 4-6 months
☐ 7-11 months
☐ 1 year or more
11. Not counting recruit training, what was the longest time you have ever quit smoking?
☐ NA - have never smoked
☐ Have never tried to quit
☐ Less than 24 hours
☐ 1 day
☐ 2-7 days
☐ 8-29 days
☐ 1-3 months
☐ 4-6 months
☐ 7-11 months
☐ 1 year or more
12. Not counting recruit training, how many times have you tried to quit smoking for one day or longer during the past 12 months?
☐ NA - did not smoke in the past 12 months
☐ Did not try to quit in the past 12 months
☐ Never quit for a whole day
☐ Once
☐ Twice
☐ Three times
☐ Four times
☐ Five or more times

INTENTIONS

13. After you leave recruit training, do you intend to smoke?
☐ Definitely No
☐ Probably No
☐ Probably Yes
☐ Definitely Yes
14. A year from now, do you see yourself as someone who smokes?
☐ Definitely No
☐ Probably No
☐ Probably Yes
☐ Definitely Yes
15. Did you use any other tobacco products in the 30 days prior to recruit training?

	No	Yes
Pipes	<input type="radio"/>	<input type="radio"/>
Cigars	<input type="radio"/>	<input type="radio"/>
Chewing tobacco	<input type="radio"/>	<input type="radio"/>
Snuff	<input type="radio"/>	<input type="radio"/>

THANK YOU FOR YOUR PARTICIPATION!

Graduation Survey

RTC GRADUATION SURVEY

Dear Participant:

As you may remember, researchers at San Diego State University, Naval Health Research Center, and the University of California, San Diego are studying tobacco use among new Navy members. The project is providing valuable information to the Navy so that it can develop programs that will help Navy personnel improve their health. We hope you will continue to participate.

Please answer all the questions honestly and to the best of your ability. Your responses are for research use only and will be kept confidential. Data will be reported so that no individual participant can be identified. If you have any questions about this survey, please contact Dr. Terry L. Conway, San Diego State University, Graduate School of Public Health, 9245 Sky Park Court, Suite 120, San Diego, CA 92123/Phone: (619) 594-8044.

Thank you for your cooperation in this project!

Privacy Act Statement

(1) Authority: Authority to request information is granted under Title 5 USC 301, Department of the Navy Regulations, and Executive Order 9396. License to administer this survey is granted under OPNAV Report Control Symbol 6100-11 which expires 30 June 1998. Personal identifiers will be used to conduct follow-on research. In addition, standard Navy personnel records may be accessed. (2) Purpose: The purpose of this survey is to collect data about tobacco use among new Navy members. (3) Routine Use(s): Information provided in this survey will be analyzed by San Diego State University. The data files will be maintained by San Diego State University and the Navy Personnel Survey System at the Navy Personnel Research and Development Center, where they will be used for determining changing trends in the Navy. (4) Anonymity: All responses will be held in confidence by San Diego State University. Information you provide will be considered only when statistically summarized with the responses of others and will not be attributable to any single individual. (5) Participation: Completion of this survey is entirely voluntary. Failure to respond to any of the questions will NOT result in any penalties except lack of representation of your views in the final results and outcomes.

IMPORTANT INSTRUCTIONS

- * USE NO. 2 PENCIL ONLY.
- * Do NOT use ink, ballpoint, or felt tip pens.
- * Erase cleanly and completely any changes you make.
- * Make black marks that fill the circle.
- * Do NOT make any stray marks on the form.

WHEN APPLICABLE:

- * Write the numbers in the boxes at the top of the block.
- * Fill in the corresponding circles below.

Please answer ALL questions. Mark NA if not applicable to you. Provide only one answer for each question.

ABOUT YOU...

Name: _____

Last First M.I.

Social Security Number:

SOCIAL SECURITY NUMBER									
			+		+				
0	2	0	0	0	0	0	0	0	0
1	-	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	2	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	5	5	5	5	5	5	5	5	5
7	-	-	-	7	7	7	7	7	7
8	5	3	3	3	4	3	3	3	3
9	-	3	3	3	4	9	9	9	9

Training Information:

DIVISION			SHIP		
0	0	9	0	0	
1	1	9	1	1	
2	2	2	2	2	
3	3	3	3	3	
4	4	4	4	4	
5	5	5	5	5	
6	6	5	6	6	
7	7	7	7	7	
8	8	8	8	8	
9	9	7	9	9	

Today's date:

DATE					
MO.		DAY		YR.	
				.	
(0)	(0)	(0)	(0)	(0)	(0)
(1)	(1)	(1)	(1)	(1)	(1)
(2)	(2)	(2)	(2)	(2)	(2)
(3)	(3)	(3)	(3)	(3)	(3)
(4)		(4)	(4)	(4)	(4)
(5)		(5)	(5)	(5)	(5)
(6)		(6)	(6)	(6)	(6)
(7)		(7)	(7)	(7)	(7)
(8)		(8)	(8)	(8)	(8)
(9)		(9)	(9)	(9)	(9)

PLEASE DO NOT WRITE IN THIS AREA

15662

SMOKING HISTORY

1. Have you smoked 100 cigarettes (5 packs) in your entire life?
 - ☐ No
 - ☐ Yes
2. How would you currently describe yourself?
 - ☐ Never smoked
 - ☐ Non-smoker/former smoker
 - ☐ Smoker (even though not allowed to smoke during training)
3. When was the last time you smoked a cigarette?
 - ☐ NA - have never smoked
 - ☐ The day I arrived at recruit training
 - ☐ Today
 - ☐ 1-7 days ago
 - ☐ 8-29 days ago
 - ☐ 1-3 months ago
 - ☐ 4-6 months ago
 - ☐ 7-11 months ago
 - ☐ 1-4 years ago
 - ☐ 5 or more years ago
4. During recruit training, did you experience any withdrawal symptoms from cigarettes?
 - ☐ NA - not a smoker
 - ☐ Not at all
 - ☐ Somewhat
 - ☐ A great deal
 - ☐ Not sure
5. Did you smoke anytime during recruit training (e.g., service week, liberty weekend)?
 - ☐ No
 - ☐ Yes
6. A year from now, do you see yourself as someone who smokes?
 - ☐ Definitely No
 - ☐ Probably No
 - ☐ Probably Yes
 - ☐ Definitely Yes

INTENTIONS

7. After you leave recruit training, do you intend to smoke?
 - ☐ Definitely No
 - ☐ Probably No
 - ☐ Probably Yes
 - ☐ Definitely Yes
8. Has the smoke-free policy at recruit training influenced your intentions to smoke after you graduate?
 - ☐ Has not influenced me one way or another
 - ☐ Has made me want to smoke even more
 - ☐ Has made me want to stay off cigarettes

9. How confident are you that you can go without smoking for 1 year after leaving recruit training?
 - ☐ Not at all confident
 - ☐ Somewhat confident
 - ☐ Confident
 - ☐ Very confident
10. If you think you might smoke after leaving recruit training, how long will you continue smoking?
 - ☐ NA - do not intend to smoke
 - ☐ Will smoke less than 1 month, then quit
 - ☐ Will smoke 1-6 months, then quit
 - ☐ Will smoke 7 or more months, then quit
 - ☐ Will continue smoking with no intention to quit
11. If there were a program for Navy women that provided free telephone counseling to help you quit smoking or stay off cigarettes, would you call?
 - ☐ NA - not a smoker
 - ☐ Definitely No
 - ☐ Probably No
 - ☐ Probably Yes
 - ☐ Definitely Yes

RTC SMOKING POLICY

12. Do you know what the smoking rules are for recruits?
 - ☐ No
 - ☐ Yes
13. Were the smoking rules for recruits enforced during recruit training?
 - ☐ Never
 - ☐ Rarely
 - ☐ Sometimes
 - ☐ Usually
 - ☐ Always
14. How often did recruits "sneak" a cigarette even though they were not supposed to?
 - ☐ Never
 - ☐ Rarely
 - ☐ Sometimes
 - ☐ Frequently
15. During recruit training, how often were you reminded or encouraged NOT to smoke?
 - ☐ Never
 - ☐ Rarely
 - ☐ Sometimes
 - ☐ Frequently
16. Please give the name and location of the command where you are going immediately after leaving recruit training:

Name of Command

City

State

3-, 6-, 12-Month Survey

OPERATION STAY QUIT FOLLOW-UP SURVEY

Dear Participant:

As you may recall, you and several hundred other new members of the U.S. Navy were selected to participate in an ongoing study of tobacco use conducted by San Diego State University, Naval Health Research Center, and the University of California, San Diego. Your participation is very important because the information you provide will help guide future smoking programs for Navy personnel.



We hope you will continue to participate by completing this short survey. This survey only takes about 5 minutes to complete. In addition, if you return the completed survey right away, we will enter your name into a monthly lottery to win \$100. We plan to publish the names of the lottery winners.*



*If you do NOT want your name published if you win, please fill in this bubble. ☐

Please answer all the questions honestly and to the best of your ability. Your responses are for research use only and will be kept confidential. Data will be reported so that no individual participant can be identified. If you have any questions about this survey, please contact Dr. Terry L. Conway, San Diego State University, Graduate School of Public Health, 9245 Sky Park Court, Suite 120, San Diego, CA 92123/Phone: (619) 594-8044.

Thank you for your cooperation in this project!

Privacy Act Statement

(1) Authority: Authority to request information is granted under Title 5 USC 301, Department of the Navy Regulations, and Executive Order 9396. License to administer this survey is granted under OPNAV Report Control Symbol 6100-11 which expires 30 June 1998. Personal identifiers will be used to conduct follow-on research. In addition, standard Navy personnel records may be accessed. (2) Purpose: The purpose of this survey is to collect data about tobacco use among new Navy members. (3) Routine Use(s): Information provided in this survey will be analyzed by San Diego State University. The data files will be maintained by San Diego State University and the Navy Personnel Survey System at the Navy Personnel Research and Development Center, where they will be used for determining changing trends in the Navy. (4) Anonymity: All responses will be held in confidence by San Diego State University. Information you provide will be considered only when statistically summarized with the responses of others and will not be attributable to any single individual. (5) Participation: Completion of this survey is entirely voluntary. Failure to respond to any of the questions will NOT result in any penalties except lack of representation of your views in the final results and outcomes.

IMPORTANT INSTRUCTIONS

- * USE NO. 2 PENCIL ONLY.
- * Do NOT use ink, ballpoint, or felt tip pens.
- * Erase cleanly and completely any changes you make.
- * Make black marks that fill the circle.
- * Do NOT make any stray marks on the form.

WHEN APPLICABLE:

- * Write the numbers in the boxes at the top of the block.
- * Fill in the corresponding circles below.

Please answer ALL questions. Mark NA if not applicable to you. Provide only one answer for each question.

PLEASE DO NOT WRITE IN THIS AREA

17009

ABOUT YOU ...

Name: _____
 Last First M.I.

Social Security Number:

SOCIAL SECURITY NUMBER								
0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9

Today's date:

DATE					
MO.		DAY		YR.	
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

SMOKING HISTORY

- Have you smoked 100 cigarettes (5 packs) in your entire life?
 - ☐ No
 - ☐ Yes
- Do you currently smoke?
 - ☐ No
 - ☐ Yes
- Do you smoke cigarettes every day or some days?
 - ☐ NA - do not smoke
 - ☐ Every day
 - ☐ Some days
- How would you currently describe yourself?
 - ☐ Experimented with smoking
 - ☐ Occasional smoker
 - ☐ Daily smoker
 - ☐ Former smoker
- When was the last time you smoked a cigarette?
 - ☐ Today
 - ☐ 1-7 days ago
 - ☐ 8-29 days ago
 - ☐ 1-3 months ago
 - ☐ 4-6 months ago
 - ☐ 7-11 months ago
 - ☐ 1-4 years ago
 - ☐ 5 or more years ago
- During the last 30 days, how many cigarettes did you smoke on a typical day when you smoked cigarettes?
 - ☐ NA - did not smoke any cigarettes in the last 30 days
 - ☐ Less than 1 cigarette, on average
 - ☐ 1-5 cigarettes
 - ☐ 6-10 cigarettes
 - ☐ 11-15 cigarettes
 - ☐ 16-20 cigarettes
 - ☐ 21-25 cigarettes
 - ☐ 26-30 cigarettes
 - ☐ 31-35 cigarettes
 - ☐ 36-40 cigarettes
 - ☐ More than 40 cigarettes
- During the last 30 days, how soon after waking up did you usually smoke your first cigarette?
 - ☐ NA - did not smoke in the last 30 days
 - ☐ Immediately after waking up
 - ☐ Within 15 minutes after waking up
 - ☐ 15-30 minutes after waking up
 - ☐ 31-60 minutes after waking up
 - ☐ 61 minutes-2 hours after waking up
 - ☐ More than 2 hours after waking up
- Thinking back, how soon after graduating from recruit training did you smoke a cigarette?
 - ☐ NA - did not smoke after recruit training
 - ☐ Immediately or the same day
 - ☐ 1-7 days after
 - ☐ 8-29 days after
 - ☐ 1-3 months after
 - ☐ 4-6 months after
 - ☐ 7-11 months after
 - ☐ About 1 year after

9. How often do you smoke in these situations?

- Workdays
- Days off from work
- Alone
- With other people
- At home
- Before work or school
- Work or school breaks
- After work or school
- In clubs or bars
- At parties

[illegible]

QUIT ATTEMPTS

10. *Since graduating from recruit training, have you tried to quit smoking?*

- ☐ NA - have not smoked since graduating from recruit training
- ☐ No
- ☐ Yes

11. *Since graduating from recruit training, how many times have you tried to quit smoking for one day or longer?*

- ☐ NA - have not smoked since graduating from recruit training
- ☐ Did not try to quit since graduating from recruit training
- ☐ Never for a whole day since graduating from recruit training
- ☐ Once
- ☐ Twice
- ☐ Three times
- ☐ Four times
- ☐ Five or more times

12. *Since graduating from recruit training, when was the last time you tried to quit smoking?*

- ☐ NA - have not smoked since graduating from recruit training
- ☐ Did not try to quit since graduating from recruit training
- ☐ Today
- ☐ 1-7 days ago
- ☐ 8-29 days ago
- ☐ 1-3 months ago
- ☐ 4-6 months ago
- ☐ 7-11 months ago
- ☐ About 1 year ago

13. Considering the last time you tried to quit smoking since graduating from recruit training, how long did you stay quit?

- ☐ NA - have not smoked since graduating from recruit training
- ☐ Did not try to quit since graduating from recruit training
- ☐ Less than 24 hours
- ☐ 1 day
- ☐ 2-7 days
- ☐ 8-29 days
- ☐ 1-3 months
- ☐ 4-6 months
- ☐ 7-11 months
- ☐ About 1 year

IF YOU HAVE NOT SMOKED SINCE GRADUATING FROM RECRUIT TRAINING, PLEASE FILL IN THIS BUBBLE ☐ AND SKIP TO QUESTION 15.

14. Below is a list of reasons people give for starting to smoke again. For each reason, fill in the appropriate bubble, No or Yes, to indicate whether it was a reason why you went back to smoking after you graduated from recruit training.

- a. To fit in with the group
- b. To help me relax
- c. To keep my weight down
- d. To show that I'm cool
- e. To show that I'm tough
- f. To look and feel like an adult
- g. To help me when I'm bored
- h. To help me concentrate
- i. To satisfy a craving
- j. To help me handle stress
- k. To help me meet people
- l. To take more work breaks
- m. To take a dare
- n. For the taste
- o. For the enjoyment of it
- p. Because most of my friends smoke
- q. Because I enjoy smoking when drinking

No

Yes

INTENTIONS

15. Which one of the following describes your intentions to quit smoking?

- ☐ NA - have not smoked since graduating from recruit training
- ☐ NA - I quit smoking after leaving recruit training
- ☐ I intend to quit in the next 30 days
- ☐ I intend to quit in the next 2-6 months
- ☐ I do not intend to quit smoking anytime soon

16. If you've quit smoking or intend to quit in the near future, how confident are you that you can go without smoking for 1 year?

- ☐ NA - do not intend to quit
☐ Not at all confident
☐ Somewhat confident
☐ Confident
☐ Very confident

17. A year from now, do you see yourself as someone who smokes?

- ☐ Definitely No
☐ Probably No
☐ Probably Yes
☐ Definitely Yes

18. How many of the people you know smoke?

- a. Family members
- b. Friends back home
- c. Friends in the Navy
- d. Supervisors/instructors
- e. Coworkers/shipmates

None	Some	Most
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Does your spouse/significant other smoke?

- ☐ NA
- ☐ No
- ☐ Yes

COMMAND SMOKING POLICY

20. Do you know what the specific rules are for smoking at your current command?

- ☐ No
- ☐ Yes

21. How do you think the smoking policy at your current command has influenced your smoking?

- ☐ Has not influenced me one way or another
- ☐ Has made me want to smoke even more
- ☐ Has made me want to stay off cigarettes

22. How often are the smoking rules enforced at your current command?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Usually
- ☐ Always

OTHER

23. Did you use any other tobacco products in the last 30 days?

- a. Pipes
- b. Cigars
- c. Chewing tobacco
- d. Snuff

No	Yes
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>

24. Since graduating from recruit training, have you...

- a. seen quit-smoking materials at your command?
- b. received quit-smoking materials in the mail?
- c. talked to someone at a smokers' helpline?

No	Yes
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>

25. To help us keep in contact with you, please provide the names and locations of your current and next duty stations/commands:

Name of Current Command _____ City _____ State _____

Name of Next Command _____ City _____ State _____

THANK YOU FOR PARTICIPATING IN THIS SURVEY!

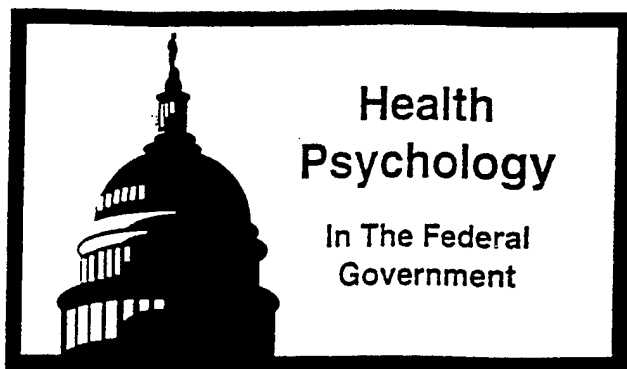
\$ Please mail the survey right away in the postage-paid envelope for a chance to win \$100!! \$

Appendix C

Publications

Manuscripts

Abstracts



Operation Stay Quit: Smoking Relapse Prevention for Navy Women Recruits

by T. L. Conway¹, S. I. Woodruff¹,
C. C. Edwards¹, J. P. Elder¹; S.-H. Zhu²,
L. K. Hervig³, and S. L. Hurtado³

It is estimated that more than 400,000 Americans die each year as a result of cigarette smoking, accounting for one in every six American deaths (American Cancer Society, 1994). Tobacco use is of particular concern to the Department of Defense (DoD) because the military overall has higher and heavier rates of tobacco use than does the civilian sector and because of the adverse effects of smoking on personnel health and performance (Bray, Marsden & Petersen, 1991; Conway & Cronan, 1992). Military women also are more likely to smoke and to be heavier smokers than civilian women (Bray, Marsden & Petersen, 1991). As the numbers and roles of women in the military expand, it is of critical importance to reduce their smoking prevalence and the smoking-related adverse effects on physical readiness, personal health, medical care costs, and the health of their children.

The Defense Women's Health Research Program (DWHRP) was created to address health problems faced by servicewomen and implement programs and policies that directly improve their safety, health, and military effectiveness. Facilitating nonsmoking among military women clearly fits within the DWHRP goal, as cigarette use is an important factor that can influence military effectiveness/readiness. For example, smokers tend to exercise less and perform more poorly on military physical fitness tests (Conway & Cronan, 1988 & 1992). This is a particularly important issue as military women prepare to go into job ratings previously unavailable to them, in large part because many of these jobs are very physically demanding.

Comprehensive DoD and service-specific policies have been implemented that address the prevention and reduction of smoking by mandating smoke-free work places and cessation support for military personnel (SECNAV, 1986; DOD, 1994). For example, the U.S. Navy prohibits tobacco use at its recruit training command for the eight-week duration of basic training. The impact of this Navy policy has

been quite positive with as much as a 40% self-reported quit rate for men and a 43% quit rate for women measured at graduation from basic training (Hurtado & Conway, 1991 & in press). However, the one-year quit rate indicated substantial relapse, with women showing a greater relapse rate at the one-year follow-up than men (sixty-seven percent relapse for women versus thirty-eight percent relapse for men). The issue of cessation is complicated by the fact that men and women have different cessation experiences. Studies point to gender differences in severity of withdrawal symptoms, self-efficacy for quitting, perceived benefits of quitting, coping strategies, and emotional reactions to smoking relapse (Blake, Klepp & Pechacek, 1989; Grunberg, Winders & Wewers, 1991; O'Connell, 1990). Thus, gender-specific interventions are needed that are effective in reducing tobacco use and maintaining quit status among military women.

"Operation Stay Quit"

To address the problem of smoking among Navy women, DWHRP has funded a 2 1/2 year study designed to test an innovative approach aimed at reducing tobacco use among Navy women recruits. "Operation Stay Quit" will evaluate two non-obtrusive relapse-prevention strategies designed to support the organizationally-enforced quit status of women recruits during the eight weeks of basic training. Recruit Training Command (RTC) at Great Lakes, Illinois is the setting for initial recruitment into the study, as well as entry and graduation assessment of smoking status. All women recruits entering the RTC for 10 consecutive months will be asked to participate in the study. Recruits who describe themselves as smokers on either the entry or graduation surveys will comprise the group to be followed over the next year. Women recruits will be assigned randomly to one of the two intervention groups or to a control group. Assessments of smoking status will be made at 3-, 6-, and 12-months after graduation from basic training.

The two relapse prevention interventions use a cognitive-behavioral approach (Marlatt & Gordon, 1985) which maintains that behavioral changes such as quitting smoking are primarily due to self-regulation (Baumeister, Heatherton & Tice, 1994) and motivation (Leventhal & Cleary, 1980). Both interventions also will address issues specific to women and cessation, based on empirical findings on gender differences in smoking cessation (Gritz, Brooks & Nielsen, 1995). One intervention group will be encouraged to access a 1-800-helpline for support and counseling to remain a nonsmoker or to quit again if they have relapsed into smoking. This is considered an "active" intervention in that it is initiated by the participant. The second intervention group will receive a series of monthly mailings to support and encourage nonsmoking during their first year of naval service. The mail intervention is considered a "passive" intervention in that no action is required by the participant. A third group will be a "standard-treatment" control group that will not receive any intervention during their first year of Naval service.

Telephone helpline intervention. The telephone helpline is an innovative approach to telephone counseling developed and operated by researchers at the University of California, San Diego. Women assigned to the telephone counseling condition will receive information describing the toll-free telephone counseling helpline, and will be encouraged to call the number upon leaving basic training. Incentives (e.g. chances at lottery prizes) will be offered to encourage women to call the helpline. Once the participant makes the initial call, the helpline counselor proceeds with scheduling follow-up calls, thus creating a proactive counseling procedure. This procedure creates a certain level of accountability, as well as fostering social support. The follow-up sessions will be sched-

uled in relation to the participant's probability of relapse, thereby providing assistance to participants when they need it most (Zhu & Pierce, 1995). This proactive counseling protocol with its relapse-sensitive schedule has been shown to as much as double the quitting success of smokers, compared to a self-help approach (Zhu, et al., 1996). The counseling protocol will be adapted to meet the particular needs of women in the Navy.

Mail support intervention. Women assigned to the mail support condition will receive cessation support materials in the mail beginning one month post-graduation. Mailed materials will include educational information along with small incentive items. Educational materials will continue to be mailed on a monthly basis for four months, then will be mailed every third month for one year. Mailed materials will be sensitive to stage-of-change and include quitting strategies relevant for Navy women.

Intervention content. In addition to the cognitive-behavioral and self-motivation elements, the interventions also will address issues known to be especially relevant to women in smoking cessation. Fear of weight gain is a well-documented reason cited by women as a barrier to quitting smoking or staying quit and is particularly relevant for Navy women who must meet body fat standards. The interventions will emphasize that weight gain is not a certainty, or is often temporary while the body adjusts to a post-smoking metabolic rate (Chen, Home & Dosman, 1993). Telephone and mailed-material content will provide women with skills to cope with the possibilities of weight gain by (a) identifying low-fat, satisfying snacks to ease cravings and control weight; (b) pointing out the dual benefits of exercise for control of cessation-related weight gain and physical readiness test performance, and (c) encouraging acceptance of small, temporary fluctuations in weight.

Several studies have indicated that women respond positively to informal social support when trying to quit or maintain their quit status (Lacey, Manfredi & Balch, 1993; Sorensen & Pechacek, 1987; Coppotelli & Orleans, 1985). Both phone and mail channels of intervention will foster informal social support through two mechanisms: (a) providing support by telephone helpline counselors or continual personalized mailed materials, and (b) encouraging participants to identify and effectively use a quit/stay-quit buddy at their current command. Women differ from men in their concern about the health risks of smoking and the perceived benefits of quitting (Lacey, Manfredi & Balch, 1993; Schuman, 1977; Sorensen & Pechacek, 1987). The immediate and longer-term benefits of cessation, including economic ones and those related to physical fitness requirements of the Navy, will be emphasized.

Studies consistently report that women are tentative about their ability to quit smoking or to stay quit. Women may attribute successful cessation to luck instead of to personal strengths, skills, and coping strategies, while relapse may be attributed to personal failure (Blake, Klepp, & Pechacek, 1989). Many women believe that "falling off the wagon" indicates permanent failure, and this belief leads to doubts about one's ability to be a non-smoker. Enhancement of perceptions of cessation self-efficacy and expectations for success will be an aim of the interventions. Recruits will be exposed to the idea that quitting is a process in which an indi-

(Continued on page 24—See Federal Government)

Postdoctoral Training in Clinical Health Psychology in the United States Air Force

by C. Keith Haddock, Anderson B. Rowan, G.
Wayne Talcott, and Risa J. Stein

Clinical Health Psychology within the United States Air Force (USAF) is a valued service and, consequently, has enjoyed sustained growth over the past decade. A renowned health psychologist, Joseph Matarazzo, serves as the Civilian Consultant to the Air Force Surgeon General. Each of the USAF's three APA accredited internship sites has a required health psychology rotation, staffed by at least one post-doctorally trained health psychologist. In addition, the USAF sponsors a one-year postdoctoral fellowship in Clinical Health Psychology at Wilford Hall Medical Center (WHMC) in San Antonio, Texas.

WHMC is a 1000-bed major medical complex which, in addition to inpatient and outpatient care, provides teaching programs for psychologists and most medical specialties. The postdoctoral fellowship in Clinical Health Psychology is housed in the Behavioral Health Psychology (BHP) Service at WHMC. Because WHMC is the final place of referral from Air Force hospitals throughout the world, BHP fellows obtain experience in the evaluation and treatment of a breadth of health problems not usually available in one locale. The BHP staff consists of three postdoctorally trained health psychologists (two military, one civilian), two postdoctoral fellows, and three to four predoctoral interns. In addition, BHP enjoys an excellent support staff.

BHP fellows receive substantive training in Clinical Health Psychology through supervision, workshops, a postdoc reading seminar, visiting professors, and professional conference attendance. Fellows receive both individual and group supervision, and also observe the staff supervision of predoctoral interns. BHP clinical workshops are typically three to four hours in length, and cover topics such as the treatment of benign headaches, biofeedback training, and treatment of sleep disorders. In addition to the workshops offered by BHP, fellows attend seminars provided by various medical services. For example, the Department of Pulmonary and Critical Care Medicine offers a series of lectures on the assessment and treatment of sleep disorders. The clinical workshops are supplemented by a weekly postdoc reading seminar which covers influential books and journal articles on health psychology and related topics.

Fellows are not only trained by the BHP staff, but by several leading health psychologists throughout the country. Each year approximately 15 eminent psychologists are invited to spend three to five days interacting with the faculty, fellows, and interns at WHMC in the form of workshops, formal presentations, and individual consultation. Typically, 3 to 4 of these individuals are

(Continued on page 25—See Air Force)

Federal Government

(continued from page 5)

vidual may have to "cycle" through several times before becoming abstinent.

Measures of effectiveness. The primary measure for evaluating intervention effects will be changes in self-reported smoking status. Items measuring duration of abstinence also will be important for examining patterns of relapse. Stage-of-change for cessation will be included as a sensitive variable that describes an individual's process of quitting and relapse. Demographic/background characteristics and Navy environment factors (e.g., type and size of duty station; rating; deployment status) will also be measured to investigate predictors of quitting and relapse.

Summary

The DoD has recently become the largest employer in the U.S. to mandate a total workplace ban in which smoking is prohibited in virtually all indoor work spaces (DoD, 1994). This ban, although highly laudable from a health and readiness perspective, places additional burdens on military personnel who continue to smoke. Consequently, it is to the military's advantage to support efforts that maintain the cessation state achieved by all military recruit smokers going through basic training. Operation Stay Quit expects to determine the relative effectiveness of the 1-800 helpline and the mail support intervention compared to the Navy's "standard treatment" in supporting smoking cessation for female recruits. Estimating that well over 30% of incoming military recruits are smokers, it is clear that the military's smoking prevalence

could be lowered dramatically within a decade if a cost-effective smoking relapse prevention program was in place to support the quit status achieved by recruit smokers during basic training. ♦

References

- American Cancer Society. (1994). *Cancer facts and figures—1994*.
Baumeister, R.F., Heatherton, T.F. & Tice, D.M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego: Academic Press.
Bray, R.M., Marsden, M.E., & Peterson, M.R. (1991). Standardized comparisons of the use of alcohol, drugs, and cigarettes among military personnel and civilians. *American Journal of Public Health*, 81(7), 865-869.
Blake, S.M., Klepp, K.I., Pechacek, T.F., et al. (1989). Differences in smoking cessation strategies between men and women. *Addictive Behaviors*, 14, 409-418.
Chen Y., Horne S.L., & Dosman, J.A. (1993). The influence of smoking cessation on body weight may be temporary. *American Journal of Public Health*, 83 (9), 1330-1332.
Conway, T.L., & Cronan, T.A. (1992). Smoking, exercise, and physical fitness. *Preventive Medicine*, 21(6), 723-734.
Conway, T.L., & Cronan, T.A. (1988). Smoking and physical fitness among Navy shipboard personnel. *Military Medicine*, 153(11), 589-594.
Coppotelli, C.H., & Orleans, C.T. (1985). Cessation maintenance among women. *Journal of Consulting and Clinical Psychology*, 53 (4), 455-460.
Department of Defense, DoDINST 1010.15, *Smoke-Free Workplace*, March 7, 1994.
Grunberg, N.E., Winders, S.E., & Wewers, M.E. (1991). Gender differences in tobacco use. *Health Psychology*, 10(2), 143-153.
Gritz, E.R., Brooks, L., & Nielsen, I. (1995). Gender differences in smoking cessation. K. Slama (Ed.), *Tobacco and Health*. Plenum Press, New York.
Hurtado, S.L., & Conway, T.L. (1991). Changes in male and female recruits' smoking behavior following a strict no-smoking policy in U.S. Navy recruit training. Unpublished data.
Hurtado, S.L., & Conway, T.L. (in press). Changes in smoking behavior following a strict no-smoking policy in U.S. Navy recruit training. *Military Medicine*.
Lacey, L.P., Manfredi, C., Balch, G., et al. (1993). Social support in smoking cessation among black women in Chicago public housing. *Public Health Reports*, 108(3), 387-394.
Leventhal H., & Cleary, P.D. (1980). The smoking problem: A review of research and theory in behavioral risk modification. *Psychological Bulletin*, 88, 370-405.
Marlatt, G.A., & Gordon, J.R. (1985). *Relapse prevention: Maintenance strategies in the treatment of addictive behavior*. New York: Guilford Press.
O'Connell, K. (1990). Smoking cessation: Research on relapse crisis. *Annual Review of Nursing Research*, 8, 83-100.
Schuman, L.M. (1977). Patterns of smoking behavior. In Jarvik, M.E., Cullen, J.W., Gritz, E.R., Vogt, T.M., and West, L.J. (eds.), *Research on Smoking Behavior*. NIDA Research Monograph No. 17, US DHEW Publication No. (ADM) 36-66, Washington, DC.
Secretary of the Navy, SECNAVINST 5100.13A, *Tobacco Prevention Program in the Navy and Marine Corps*, July 17, 1986.
Sorensen, G., & Pechacek, T.F. (1987). Attitudes toward smoking cessation among men and women. *Journal of Behavioral Medicine*, 10(2), 129-137.
Zhu, S-H. & Pierce, J.P. (1995). A new scheduling method for time-limited counseling. *Professional Psychology: Research and Practice*, 6, 624-625.
Zhu, S-H., Stretch, V., Balabanis M., Rosbrook, B., Sadler, G. & Pierce, J.P. (1996). Telephone counseling for smoking cessation: Effects of single-session and multiple-session intervention. *Journal of Consulting and Clinical Psychology*, 64, 202-211.

¹San Diego State University

²University of California, San Diego

³Naval Health Research Center, San Diego

Corresponding author: Terry L. Conway, Ph.D.; Operation Stay Quit/SDSU; 9245 Sky Park Court, Suite 120; San Diego, CA 92123.

WANTED Letters to the editor!

Dear Editor,

Although I read each issue of *The Health Psychologist*, I never see any letters to the editor from any of our members. Is this because you never get any, or because you refuse to print them? I dare you to print this one!

Sincerely,
Curious Member

Dear Curious Member,

I would be thrilled to print more letters such as yours! Maybe this will stimulate others to follow in your footsteps.

Yours truly,
The Editor

Forward *your* letter to:
Ken Wallston
Editor, *The Health Psychologist*
Vanderbilt University School of Nursing
429 Godchaux Hall
Nashville, Tennessee 37240
Fax: (615) 343-7711

Tobacco use and the United States military: a longstanding problem

Ties between the United States military and the tobacco industry trace back to the early parts of the 20th century. During the second world war, for example, cigarette advertisements praising service members were widespread on popular radio programmes and in periodicals.¹ Some ads even featured cigarette-using doctors vouching for the great taste and mildness of particular brands. Cigarettes were also included as part of the K-rations and C-rations provided to soldiers and sailors during the second world war, and these cigarettes frequently became more valuable for trading or selling than the food items in the rations.

During times of war and peace, many young people (predominantly men, as they have traditionally comprised the bulk of military personnel) started smoking after they joined the military. In fact, it has been widely acknowledged in military circles that many young soldiers and sailors first started smoking during their initial military "boot camp" training. Before 1987, when tobacco use was banned at most training commands across the military services, giving or denying "smoke breaks" was a common form of reward and punishment used by drill instructors and company commanders training new soldiers or sailors.² If recruits did not already smoke when they entered the military, in boot camp they quickly learned that smoking to get a work break was a desirable thing to do. Even beyond recruit training, the military culture—at least until relatively recently—has traditionally fostered the stereotype of heavy-smoking, hard-drinking, and adventuresome service members.

This image has had empirical support from several studies indicating that military rates of tobacco and alcohol use have been higher than those found in comparable civilian sectors.³⁻⁷ As of 1995, however, the military/civilian differences in tobacco use have narrowed.⁸ Considering all the services combined, the differences between the military and standardised civilian samples reach statistical significance only among young 18-25 year old men. However, differences exist across the different branches of the service. For example, male marines and navy men overall have significantly higher smoking rates than civilian men; younger army men under 26 years of age have statistically higher rates of smoking than civilian men. Air force men, in contrast to the other services, have lower smoking rates overall than civilian men. These trends are similar for women military personnel, although the differences between military and civilian women are much smaller and typically are not statistically significant.⁸

Paralleling civilian-sector efforts during the 1980s, the Department of Defense (DoD) increased health promotion efforts aimed at improving health and physical readiness.⁹⁻¹⁰ Among these were programmes to curb tobacco use among military personnel. And, in fact, smoking in the military has decreased dramatically since 1980,¹¹ paralleling trends observed in the civilian sector. However, the prevalence of tobacco use currently is still well above the *Healthy people 2000* goal of no more than 20% smokers in the military.¹² Furthermore, the high rates of smoking among military personnel persist after discharge from military service. Compared with non-veterans, veterans are more likely to be current smokers.¹³⁻¹⁴

Smoking among American service members is an important factor that can influence military readiness. Several studies have reported data indicating that there are

negative relationships between smoking and various measures of "performance readiness". Smokers exercise less and perform more poorly on physical fitness tests,¹⁵⁻¹⁷ and they are less successful in combat training.¹⁸⁻¹⁹ Smokers also have higher rates of various types of illnesses and absenteeism from the job.²⁰⁻²¹ The effects of regular tobacco use clearly are incompatible with maintaining the physical abilities necessary to perform at peak levels in the very physically demanding jobs that are commonplace in the military.

Data presented by Haddock *et al*²² in this issue of *Tobacco Control* provide further evidence that smoking is still a matter for concern even among air force personnel, who have lower smoking rates than all of the other services. Not only is regular smoking quite prevalent among entering air force recruits (32% during 1995-1996), but Haddock and colleagues also found that regular smoking before entering training was associated with other risk factors believed to lower military readiness. Compared with air force recruits who had not smoked regularly before entering training, those who were smokers were more likely to report higher alcohol use, more frequent binge drinking, more smokeless tobacco use, and less physical activity. As Haddock *et al* point out, their data add to the growing body of literature indicating that smokers tend to engage in clusters of unhealthy behaviours.

Given that the rates of cigarette smoking among United States military personnel tend to be higher than smoking rates in the civilian sector, a logical question to ask is whether the military "attracts" or "creates" smokers. That is, are the higher rates of smoking in the military a result of self-selection of smokers joining the services, or are there aspects of the military environment and institutional norms that promote smoking among its members? One of the earliest studies to address this question was a cross-sectional comparison of United States Navy male shipboard personnel with incoming recruits conducted in the mid-1980s before the smoking ban in recruit training.²³ Although design limitations necessarily temper inferences that can be drawn from this study, findings did suggest that the military experience fostered cigarette use. Similarly, a longitudinal examination of the patterns of smoking initiation among male recruits during their first year in the navy (conducted during 1986, before the recruit training smoking ban) showed an increase in their smoking rate by 12 percentage points (28% to 40%).²⁴

The study by Chisick, Poindexter, and York²⁵ in this issue of *Tobacco Control* addresses the issue of whether the military environment somehow encourages service members to initiate tobacco use on a much larger scale than did these earlier small studies on navy personnel. Using a cross-sectional survey design, data on tobacco use that were collected during 1994 in conjunction with dental examinations compared random samples of new recruits and active duty personnel from all four branches of the military. Chisick and colleagues' data indicate that tobacco use rates were significantly higher among active duty men than among incoming male recruits. Although the data are cross-sectional, their findings suggest that exposure to the military environment might lead to increases in tobacco use by young enlisted men; however, the data for women did not show a similar pattern.

One caveat regarding the findings presented by Chisick *et al.*²⁵ is that it is likely the methods used to estimate smoking rates produced some bias toward under-representing tobacco use among new military recruits. A smoker, for example, was defined as someone who answered "yes" to the question: "Do you smoke cigarettes now?" As recruits were asked this question during in-processing, which occurs during the first three days following arrival at a basic training centre, they were already in an environment that prohibited any form of tobacco use at any time (a total ban from the moment they arrived at the training centre). It is likely, therefore, that some recruits who would have been defined as smokers using other usual criteria—for example, smoked a cigarette during the past 30 days—were instead defined as non-smokers because they responded literally and said "no" to the question about whether they smoked "now"—which was prohibited under the training centre's tobacco ban.

Nonetheless, Chisick and colleagues make the important point that the challenge to military policy makers is to find ways to curb the initiation of tobacco use that may occur as a result of exposure to the military environment.²⁵ This challenge is enhanced by findings indicating that there are substantial differences in tobacco use rates by branch of service, gender, and race. These differences suggest that multiple strategies for various subgroups may be warranted both for preventing initiation among new service personnel who do not smoke when they enter the military, as well as for cessation efforts to help those who already use tobacco to quit.

For some time now, military policy makers have had a keen interest in reducing the high rates of smoking among its personnel because of the known negative health and readiness effects. In addition to the negative associations between smoking and physical readiness, smoking-related healthcare costs in the DoD are estimated at about \$530 million a year and associated lost productivity costs at about \$345 million.²⁶ Developing cost-effective strategies to prevent initiation of smoking and to help smokers quit is, therefore, a priority from a military healthcare planning perspective.²⁷

Banning tobacco use entirely during recruit training, which was done at most training centres about 1987, was an important step in starting to modify aspects of the military environment to reduce tobacco use among service members. Non-smokers coming into the military now at least do not start smoking during boot camp training, as certainly was the case before the ban.²⁴ Furthermore, the tobacco use ban during recruit training probably helps a higher percentage of smokers quit and to stay quit at a rate higher than would be expected without the ban.²⁸⁻²⁹ It is also impressive that the Department of Defense now has the distinction of being the largest employer in the United States with a worksite ban on tobacco use that prohibits smoking within all its buildings. This too is an important step, as restrictive smoking regulations seem to have a significant effect on cigarette consumption.³⁰⁻³²

In addition to these regulations, further reductions in military tobacco use rates are likely to require stepped-up efforts involving educational, motivational, and social/environmental changes. Stronger educational messages, including ones orientated toward changing social norms regarding smoking in the military, could be initiated in recruit training. Further support for continued non-smoking after leaving the 24-hour-per-day tobacco use ban imposed during recruit training could also be very useful for new graduates of recruit training. Unfortunately, the first thing many recruits want to do immediately after leaving the restrictive environment of recruit training is to exercise the "personal freedom" to smoke as soon as they

are able. In addition, many work settings to which recruit training graduates are first assigned involve a lot of "hurry up and wait" time, where individuals fluctuate between being stressed and bored. In fact, some of the most common reasons new military members give for smoking after leaving recruit training are to deal with stress, boredom, or just to be sociable in a new job setting. As Haddock and colleagues found in their data,²² the strongest predictors of smoking among air force recruits were social, such as having more friends who smoke and viewing smoking as more "socially attractive". Thus, a promising approach to reducing military tobacco use might focus on changing social norms regarding the attractiveness of smoking and encouraging groups of friends to support each other's attempts to become or remain smoke-free.

Also, as pointed out by Chisick and colleagues,²⁵ some of the military's own contradictory co-existing policies on tobacco might be contributing to its tobacco use problem. For example, despite the total tobacco use ban during recruit training, worksite bans on smoking in DoD buildings, and a wide variety of smoking cessation programmes, discounted cigarettes are still readily available in commissaries and exchanges at prices substantially lower than in the surrounding civilian community. It is estimated that commissaries total about \$458 million in tobacco sales per year.²⁶ Part of the profits from these tobacco sales go to military Morale, Welfare, and Recreation (MWR), which provides many positive "health and welfare services" for the troops. Thus, there are clearly contradictory forces working when it comes to reducing cigarette sales at the cost of monetary profits that go to help military personnel through this channel.

There are many inherent difficulties in trying to eliminate a behaviour—tobacco use—that many individuals in the military firmly believe is a right and personal freedom that they should not be forced to give up. Yet, it is equally clear that tobacco use is incompatible with the requirements for optimal health and physical readiness that are essential for military forces to perform at peak levels. Military policy makers should be commended, especially given the historical traditions involving tobacco use, for making many quite aggressive changes since the early 1980s aimed at reducing rates of tobacco use among American service members. Strong additional efforts, however, are necessary to reach the *Healthy people 2000* goal of no more than 20% military smokers,¹² and for the military to reach its own goal of becoming smoke-free. Key to reaching these goals is strong leadership from top levels down, with the most senior leaders down to the most junior leaders setting examples and standards for good health and fitness. Strong leadership can change military social norms in the direction of unacceptability of tobacco use, which would have a significant impact on tobacco use among service members—and this is a reachable goal, as the United States military knows a lot about leadership.

TERRY L CONWAY

San Diego State University,
9245 Sky Park Court, Suite 120,
San Diego, California 92123-4311, USA.
tconway@mail.sdsu.edu

- 1 Blake GH. Smoking and the military. *NY State J Med* 1985;85:354-6.
- 2 Cronan TA, Conway TL. Evaluation of smoking interventions in recruit training. *Mil Med* 1989;154:371-5.
- 3 US Department of Health and Human Services. *Reducing the health consequences of smoking: 25 years of progress. A report of the Surgeon General, 1989*. Rockville, Maryland: Public Health Service, Centers for Disease Control, Office on Smoking and Health, 1989. (DHHS Publication No (CDC) 89-8411.)
- 4 Bray RM, Marsden ME, Peterson MR. Standardized comparisons of the use of alcohol, drugs, and cigarettes among military personnel and civilians. *Am J Public Health* 1991;81:865-9.

- 5 Bray RM, Guess LL, Marsden ME, *et al.* Prevalence, trends, and correlates of alcohol use, nonmedical drug use, and tobacco use among US military personnel. *Mil Med* 1989;154:1-11.
- 6 Conway TL, Trent LK, Conway SW. *Physical readiness and lifestyle habits among US navy personnel during 1986, 1987, and 1988.* Technical Report No 89-24. San Diego, California: Naval Health Research Center, 1989.
- 7 Ballweg JA, Bray RM. Smoking and tobacco use by US military personnel. *Mil Med* 1989;154:165-8.
- 8 Bray RM, Kroutil LA, Wheelless SC, *et al.* 1995 Department of Defense survey of health related behaviors among military personnel. Report No RT/6019/06-FR. Research Triangle Park, North Carolina: Research Triangle Institute, 1995.
- 9 Department of Defense. *DoD Directive 1010.10, Health promotion (NOTAL).* Washington, DC: Department of Defense, 11 March 1986.
- 10 Secretary of the Navy. *SENAV INSTRUCTION 6100.5 Health Promotion Program.* Washington, DC: Department of the Navy, 17 September 1986.
- 11 Kroutil LA, Bray RM, Marsden ME. Cigarette smoking in the US military: findings from the 1992 Worldwide Survey. *Prev Med* 1994;23:521-8.
- 12 US Department of Health and Human Services. *Healthy people 2000: national health promotion and disease prevention objectives.* Washington, DC: US Government Printing Office, 1991. (DHHS Publication No (PHS) 91-50212.)
- 13 Feigelman W. Cigarette smoking among former military service personnel: a neglected social issue. *Prev Med* 1994;23:235-41.
- 14 Kleven RM, Giovino GA, Peddicord JP, *et al.* The association between veteran status and cigarette-smoking behaviors. *Am J Prev Med* 1995;11:245-50.
- 15 Conway TL, Cronan TA. Smoking and physical fitness among Navy shipboard personnel. *Mil Med* 1988;153:589-94.
- 16 Conway TL, Cronan TA. Smoking, exercise, and physical fitness. *Prev Med* 1992;21:723-34.
- 17 Bahrke MS, Baur TS, Poland DF, *et al.* Tobacco use and performance on the US Army physical fitness test. *Mil Med* 1988;153:229-35.
- 18 Zadoo V, Fengler S, Catterson M. The effects of alcohol and tobacco on troop readiness. *Mil Med* 1993;158:480-4.
- 19 Blake GH, Parker JA. Success in combat training: the role of cigarette smoking. *J Occup Med* 1991;33:688-90.
- 20 Kristen MM. How much can business expect to profit from smoking cessation? *Prev Med* 1983;12:358-81.
- 21 US Centers for Disease Control. Medical care expenditures attributable to cigarette smoking—US, 1993. *MMWR* 1993;43:469-72.
- 22 Haddock CK, Klesges RC, Talcott GW, *et al.* Smoking prevalence and risk factors for smoking in a population of United States Air Force basic trainees. *Tobacco Control* 1998;7:232-5.
- 23 Cronan TA, Conway TL. Is the Navy attracting or creating smokers? *Mil Med* 1988;153:175-78.
- 24 Cronan TA, Conway TL, Kaszas SL. Starting to smoke in the Navy: when, where, and why? *Soc Sci Med* 1991;33:1349-53.
- 25 Chisick MC, Poindexter FR, York AK. Comparing tobacco use among incoming recruits and military personnel on active duty in the United States. *Tobacco Control* 1998;7:236-40.
- 26 Military smoking report. *US Med* 1997 Feb:161.
- 27 Miller MJ, Ortmeier BG, Draugalis JR, *et al.* A retrospective analysis of the costs and consequences of a tobacco-cessation program for active duty service members. *Mil Med* 1996;161:420-4.
- 28 Hurtado SL, Conway TL. Changes in smoking prevalence following a strict no-smoking policy in US Navy recruit training. *Mil Med* 1996;161:571-6.
- 29 Woodruff SI. *The epidemiology of smoking among US Navy women recruits: prevalence, correlates, and short-term effects of involuntary cessation.* Doctoral dissertation, San Diego State University—University of California, San Diego Joint Doctoral Program in Epidemiology, 1998.
- 30 Rigotti NA, Pashos CL. No-smoking laws in the United States: an analysis of state and city actions to limit smoking in public places and workplaces. *JAMA* 1991;266:3162-7.
- 31 Simonich WL. *Government antismoking policies.* New York: Peter Lang, 1991.
- 32 Wasserman J, Manning WG, Newhouse JP, *et al.* The effects of excise taxes and regulations on cigarette smoking. *J Health Econ* 1991;10:43-64.

SHORT REPORT

Does the US Navy attract young women who smoke?

Kathleen B Weaver, Susan I Woodruff, Terry L Conway, Christine C Edwards, Shu-Hong Zhu, John P Elder

Abstract

Objective—To assess whether the United States Navy is disproportionately attracting and recruiting female smokers from the civilian sector.

Methods—Standardised comparisons of cigarette use among Navy women recruits and civilian women were conducted with data from a 1996-97 Department of Defense study and the 1994 National Health Interview Survey.

Results—Young Navy women recruits (18-22 years) had significantly higher rates of current and heavy smoking than their civilian counterparts after adjusting for differences in sociodemographic characteristics. Smoking rates among older recruits and civilian women (23-30 years) were not significantly different.

Conclusions—It seems that the Navy attracts young civilian women who already smoke, many of whom smoke heavily.

(*Occup Environ Med* 1998;55:792-794)

Keywords: smoking; military; women; tobacco use

The civilian population has seen dramatic decreases in smoking rates in the past 30 years.^{1,2} Although this decreasing trend has also been evident in the United States military services, smoking rates remain higher among military personnel than among civilians.^{3,4} Tobacco use is of particular concern to the United States Navy as it is estimated that 35% of Navy personnel are smokers compared with 25% of civilians.^{1,4} Studies in the 1980s suggested that the military services were creating smokers rather than attracting them, and that military policies and programmes at the time had not been effective in reducing smoking.^{5,7} The present study considers the attracting part of the creating versus attracting question and focuses on women just entering the United States Navy. No studies to date have been conducted that focus exclusively on military women, and no studies have compared smoking rates among new military recruits and civilians. This paper reports the results of standardised comparisons of cigarette use among US Navy women recruits and their counterparts in the general population. By

conducting standardised comparisons, the question of whether the Navy recruits female smokers can be answered more definitively.

Methods

DATA SOURCES

Navy women recruits

This study was part of a larger project sponsored by the Department of Defense to assess the long term effectiveness of two smoking relapse prevention strategies for Navy women.⁸ Data for Navy women recruits were taken from baseline surveys on tobacco use of all women entering basic training at the United States Navy Recruit Training Command at Great Lakes, Illinois during March 1996 to March 1997. Sociodemographic data were extracted from the computerised Navy enlisted master record (EMR). The record is maintained by the Bureau of Naval Personnel and is used in processing personnel information for all active duty Navy enlisted members.

Of the 5894 Navy women recruits eligible for participation in the study, a total of 5503 (93%) completed a baseline survey. Baseline surveys were matched with sociodemographic data from the enlisted master record by social security number. Twenty four surveys could not be matched. Also, women who were aged 17 on entry into the recruit training (n=325) were excluded from the present analysis due to incomparability with the female civilian population data. Women older than 30 were excluded because of low numbers (n=73). Thus, 5081 surveys (92% of the original surveys) were available for analysis.

Civilian women

Civilian data were extracted from the 1994 National Health Interview Survey, which collects information related to health on a yearly basis through face to face interviews with a sample from the civilian non-institutionalised population residing in the United States. The Year 2000 Objectives Supplement to the National Health Interview Survey was administered to one adult person per family in half of the households in the 1994 sample, and contains questions about tobacco use. A basic weighting was applied which reflects the probability of selection and household non-response, resulting in national estimates of

Center for Behavioral
and Community
Health Studies,
Graduate School of
Public Health, San
Diego State University,
San Diego, CA, USA
K B Weaver
S I Woodruff
T L Conway
C C Edwards
J P Elder

Department of Family
and Preventive
Medicine, University
of California, San
Diego, 9500 Gilman
Drive, La Jolla, CA,
USA
S-H Zhu

Correspondence to:
Dr Susan I Woodruff,
Graduate School of Public
Health, San Diego State
University, 9245 Sky Park
Court, Suite 120, San Diego,
CA 92123, USA. Telephone
001 619 594 2787; fax 001
619 594 3143; email
swoodruff@mail.sdsu.edu

Accepted 10 July 1998

Table 1 Sociodemographic characteristics of navy women recruits and civilian women, age 18–30

Sociodemographic characteristic	Civilian (n=2536) %	Navy (n=5081) %
Age:		
18–19	11.1	62.1
20–22	19.2	26.5
23–30	69.7	11.4
Race or ethnicity:		
White, non-Hispanic	67.0	58.2
Black, non-Hispanic	16.5	23.2
Hispanic	11.8	12.3
Other	4.7	6.3
Education:		
<High school	15.9	5.4
High school	38.0	85.3
>High school	46.0	9.4

Civilian percentages are based on cases from the 1994 National Health Interview Survey weighted to account for the probability of selection and household non-response.

smoking. The Year 2000 objectives supplement includes a total of 19 738 interviews for a response rate of 79.5%. Sociodemographic and cigarette use variables for all women between the ages of 18 and 30 were extracted from the National Health Interview Survey, for a total of 2536 cases.⁹

STANDARDISATION PROCEDURES

Direct standardisation was used to adjust for sociodemographic differences between the two populations.¹⁰ Civilian data were standardised to the joint distribution in the population of Navy women recruits of race or ethnicity (white, black, Hispanic, other) and education (less than high school, high school, more than high school).

The DESCRIPT procedure in SUDAAN¹¹ was used to handle the complex National Health Interview Survey sampling design and to produce standardised estimates and standard errors for the civilian data. Unstandardised estimates for Navy women recruits were compared with standardised estimates for the civilian women with a difference of proportions *z* test.¹² Comparisons are reported within three age strata: 18–19, 20–22, and 23–30. These age groupings were chosen to represent older teens, women in their early 20s, and what would be considered relatively older women in the context of the military recruit population. Because there were few women recruits in their mid to late 20s, it was not possible to look at finer age groupings.

MEASURES OF CIGARETTE USE

Navy and civilian women were categorised as smokers based on identical survey items. Those who reported smoking 100 cigarettes in their entire life and smoking in the past 30 days were classified as current smokers.⁴ Current smokers who reported smoking ≥ 16 cigarettes a day were classified as heavy smokers.

Results

As shown in table 1, the Navy recruit population is younger, less educated, and somewhat more ethnically diverse, with larger percentages of African American and Hispanic women than the civilian population.

Results of the comparisons of current and heavy smoking between Navy women recruits and civilian women are presented in table 2. Standardised comparisons for women 18–19 years old and those 20–22 years old were significant, with Navy women recruits having higher prevalences of current and heavy smoking in both of these age strata. For women 23–30 years old, differences in current and heavy smoking between the Navy and civilians were not significant.

Discussion

This report provides evidence that the United States Navy disproportionately recruits more young women who already smoke before entering military service. This is especially apparent among young women (aged 18–22). Even after controlling for race or ethnicity and education, young Navy women recruits had significantly higher smoking rates than their civilian counterparts. Among older women (ages 23–30), there was no significant difference in current or heavy smoking prevalence between the two populations after adjusting for sociodemographic factors.

Two limitations of the present study should be noted. Firstly, data for Navy women recruits were collected in 1996–7, whereas the data for civilian women were collected in 1994. However, assuming that smoking rates among women have continued to show the gradual decline seen before 1994,¹³ the results of this study are conservative—that is, the 1996–97 civilian smoking rates might actually be slightly lower than the 1994 rates used in these analyses. A second limitation is that these data sets were collected with different methods of survey

Table 2 Comparisons of current and heavy smoking among navy women recruits and civilian women by age group

Age group	Current smoking					Heavy smoking				
	Navy	Civilian	Difference	95% CI	p Value	Navy	Civilian	Difference	95% CI	p Value
18–19:										
% Yes	35.5	16.7	18.8	14.2 to 23.6	≤ 0.001	13.2	5.5	7.7	4.8 to 10.6	≤ 0.001
SEM	0.9	2.5				0.6	1.6			
n	3148	277				3145	277			
20–22:										
% Yes	40.9	29.5	11.4	6.5 to 16.3	≤ 0.001	17.9	8.3	9.6	6.4 to 12.8	≤ 0.001
SEM	1.3	2.8				1.0	2.0			
n	1343	474				1340	474			
23–30:										
% Yes	32.8	34.7	1.9	–2.5 to 6.3	NS	14.5	11.1	3.4	0.2 to 6.6	NS
SEM	2.0	1.7				1.5	1.1			
n	576	1725				574	1723			

Civilian estimates have been standardised to the Navy distribution of education and race or ethnicity. Civilian data source: 1994 National Health Interview Survey.

administration: the Navy recruit data were collected with self report questionnaires whereas the civilian data were collected in face to face interviews. These differences suggest caution in drawing conclusions from the present study.

Our results from the present study indicate that the Navy is dealing with a population of women who have high smoking rates from the outset of military service. Why the Navy may attract young smokers is not clear. Certain personality factors (sensation seeking, risk taking, rebelliousness, confidence) may play a part. There may be geographical differences such that women who come from regions with high smoking rates may join the Navy in disproportionate numbers. Unmeasured peer and parental factors—for example, veteran status of father—also may influence a young woman to smoke and to choose to join the Navy. Whatever the explanatory factors, however, this finding underscores the need for intensified programmes directed towards stopping smoking during the recruit training period. Perhaps more importantly, there is a need to create expectations among potential recruits that the Navy environment is non-smoker friendly. In 1987, the United States Navy instituted a 24 hour smoking ban during the entire 8 week period of recruit training, and in 1994 the Navy became a smoke free workplace. These are important steps toward changing the Navy environment, which has historically tolerated (and perhaps promoted) smoking. However, more interventions are needed to change other aspects of Navy culture that may foster cigarette use. The military services have a unique opportunity to make a positive impact by reducing cigarette use among its recruits and personnel. Most people who enter military

service return to the civilian sector after a relatively brief period of service. Thus, decreasing smoking rates among service personnel would reduce health related costs not only for the military service, but ultimately for the civilian sector as well.

This research was supported by the Department of Defense (DoD), Defense Women's Health Research Program (DAMD17-95-5075), and by the augmentation awards science and engineering research training (AASERT) grant No DAAH04-96-0116. We gratefully acknowledge Drs Stephen Bender and Richard Hough for their critique of earlier drafts of this manuscript.

- 1 Centers for Disease Control and Prevention. Surveillance for selected tobacco-use behaviors—United States, 1990–94. *MMWR CDC Surveill Summ* 1994;43:SS-3.
- 2 National Center for Health Statistics. *Health, United States, 1995*. Hyattsville, MD: Public Health Service, 1996.
- 3 Bray RM, Kroutil LA, Marsden ME. Trends in alcohol, illicit drug, and cigarette use among US military personnel: 1980–92. *Armed Forces and Society* 1995;21:271–93.
- 4 Bray RM, Kroutil LA, Wheelless SC, et al. 1995 *Department of Defense survey of health related behaviors among military personnel*. Research Triangle Park, NC: Research Triangle Institute, 1995.
- 5 Cronan TA, Conway TL. Is the Navy attracting or creating smokers? *Mil Med* 1988;153:175–8.
- 6 Bray RM, Marsden ME, Peterson MR. Standardized comparisons of the use of alcohol, drugs, and cigarettes among military personnel and civilians. *Am J Public Health* 1991;81:865–9.
- 7 Cronan TA, Conway TL, Kaszas SL. Starting to smoke in the Navy: when, where, and why. *Soc Sci Med* 1991;33:1349–53.
- 8 Conway TL, Woodruff SI, Edwards CC, et al. Operation stay quit: smoking relapse prevention for Navy women recruits. *Health Psychol* 1996;18:4–5,24.
- 9 Current estimates from the National Health Interview Survey, 1994. *Vital Health Stat* 10. 1996;193. (DHHS publication PHS 96-1521.)
- 10 Kalton G. Standardization: a technique to control for extraneous variables. *Applied Statistics* 1968;23:118–36.
- 11 *SUDAAN (Software for survey data analysis) version 5.30 manual*. Research Triangle Park, NC: Research Triangle Institute; 1989.
- 12 Fleiss JL. *Statistical methods for rates and proportions*. New York, NY: John Wiley, 1973.
- 13 Shopland DR, Hartman AM, Gibson JT, et al. Cigarette smoking among US adults by state and region: estimates from the Current Population Survey. *J Natl Cancer Inst* 1996;88:1748–58.

This study examined the effectiveness of a stepped approach for increasing response rates to a mailed follow-up smoking survey among newly enlisted women in the navy. The effect of the stepped approach on response rates and on the characteristics of respondents was evaluated. Also, costs were estimated for each of the steps to determine their relative benefits. Results showed that the stepped approach was effective in more than doubling the survey response rate among smokers. Reluctant respondents did not differ from on-time respondents in terms of demographics or baseline smoking, although nonrespondents were less educated and heavier smokers than on-time and reluctant respondents. Strategies documented here could well apply to survey efforts with other hard-to-reach populations.

ENHANCING RESPONSE RATES TO A SMOKING SURVEY FOR ENLISTED U.S. NAVY WOMEN

SUSAN I. WOODRUFF
CHRISTINE C. EDWARDS
TERRY L. CONWAY
San Diego State University

Mailed surveys, frequently used to evaluate the effects of various programs and interventions, are convenient and tend to be less expensive to conduct than either telephone or in-person surveys (Permegeter, Eitter, and Rougemont 1993). However, a primary problem with using mailed surveys is the typically low response rate of participants and differential response among particular groups of people (Fox, Crask, and Kim 1988; Tambor et al. 1993). Nonresponse presents potential biases that can limit the generalizability and threaten the validity of survey results (Kristal et al. 1993). Nonre-

AUTHORS' NOTE: This research was supported by a grant from the Department of Defense, U.S. Army Medical Research and Materiel Command (No. DAMD17-95-1-5075). Correspondence should be addressed to Susan I. Woodruff, San Diego State University, Graduate School of Public Health, 9245 Sky Park Court, Suite 120, San Diego, CA 92123; phone voice mail: (619) 594-2787; fax: (619) 594-3143; e-mail: swoodruff@mail.sdsu.edu.

EVALUATION REVIEW, Vol. 22 No. 6, December 1998 780-791

© 1998 Sage Publications, Inc.

780

sponse to health surveys is typically associated with lower socioeconomic status, young age, male sex, minority status, and health-risk behaviors (e.g., smoking) (Armstrong, White, and Saracci 1992). Similarly, within the military, response rates to surveys may be substantially lower among young, enlisted personnel who are in the lower ranks (Naval Health Research Center, personal communication, 1997).

If results of mailed surveys are to be reliable and useful, it is critical to implement strategies that will generate the highest response rates possible and capture a representative sample of respondents. Numerous studies have tested different methods for increasing mailed survey response rates. For example, studies examining the impact of a monetary incentive or the promise of a monetary incentive on response rates found that this type of incentive produces a significantly higher response rate than any other type of incentive alone (Permegeter, Eitter, and Rougemont 1993; Hopkins 1992). Other studies have found that the use of postage stamps rather than business reply postage significantly improves response rates (Urban, Anderson, and Tseng 1993; Armstrong and Lusk 1987). Still other studies have examined the effects of telephone calling efforts, leaving messages on telephone answering machines, and combining a personal phone call with a letter on survey response rates (Kristal et al. 1993; Harlow et al. 1993; Pottick 1991). In a recent study conducted by Morrison and colleagues (1997), a multistaged approach using telephone calls, incentives, and second mailings of health surveys resulted in a 92% follow-up of the original cohort during a 2-year period. The military also has investigated strategies that enhance survey response rates. For example, in a study of adverse reproductive outcomes among Gulf War veterans, strategies to increase response rates to self-administered surveys included use of scannable surveys, prenotification letters, reminder postcards, metered and certified mail, business reply envelopes, completion deadline, and repeated mailings (Kamens et al. 1997).

Although every reasonable effort should be made to increase response rates, it is imperative to weigh the costs of these efforts against the potential benefits. The costs incurred by mailing reminder postcards are minimal compared to the benefit of increased returned surveys; however, the costs associated with sending out a complete second mailing of a survey, reply envelope, and introductory letter are much greater and may not increase the response rate significantly (Permegeter, Eitter, & Rougemont 1993). Providing a monetary incentive clearly increases costs; however, monetary incentives appear to be the most likely to prompt a return and may be well worth the additional costs. A study conducted by James (1992) examined whether large monetary incentives can significantly increase response rates. Their findings indicated that the response rate increased as the incentive amount increased.

The purpose of this study was to examine the effectiveness of a stepped approach for increasing response rates to a follow-up smoking survey among newly enlisted women in the U.S. Navy. The effect of this layered approach on response rates and on the characteristics of respondents was evaluated. Demographic and smoking-related characteristics were compared for those responding on time to the initial mailed follow-up survey, reluctant respondents, and nonrespondents. In addition, costs were estimated for each of the steps to determine the relative benefit of such an approach. In general, this population is young, ethnically diverse, relatively unskilled, mobile, and in some respects considered high-risk in terms of health behaviors (Bray et al. 1995). Cost-effective strategies that enhance response rates among this group may well work with other at-risk, hard-to-reach populations.

METHODS

PARTICIPANTS AND SETTING

Study participants consisted of volunteers from among all female recruits entering the U.S. Navy between March 1996 and March 1997 (12 consecutive months). These recruits were volunteers for a larger, longitudinal intervention study of smoking cessation/relapse prevention strategies for navy women during their first year of service (see Conway et al. 1996 for a description of the overall study). During the course of the year, 5,503 women provided consent and completed machine-scannable baseline surveys at the beginning of basic training—93% of those eligible. Table 1 shows that women recruits were young, with more than 90% being younger than 24 years of age. The mean age was 19 years ($SD = 2.75$). The majority (85%) had a high school education. The recruit sample was ethnically diverse: Almost 60% were White/non-Hispanic, and Blacks made up a substantial percentage of recruits (23%).

PROCEDURES FOR 3-MONTH FOLLOW-UP SURVEY

All female recruits who reported on the baseline survey that they had any experience with smoking comprised the cohort of smokers, who were mailed a scannable follow-up survey 3 months after leaving basic training. These individuals included those who identified themselves at baseline as daily smokers, occasional smokers, experimenters, or former smokers. The study used

TABLE 1: Sociodemographic Characteristics of Women Entering the U.S. Navy During a 1-year Period

Sociodemographic Characteristic	%	n
Age		
17-18	41.1	2,253
19-23	50.4	2,761
24 or older	8.5	465
Missing		24
Education		
Less than high school	5.5	302
High school	85.1	4,666
More than high school	9.4	513
Missing		22
Race/ethnicity		
White, non-Hispanic	57.9	3,169
Black	23.3	1,273
Hispanic	12.2	670
Asian/Pacific Islander	4.2	228
Native American	2.4	130
Missing		33

several navy data sources to locate and track smokers after basic training for the purpose of conducting the 3-month smoking survey. No fewer than two attempts were made to deliver the 3-month surveys to a valid address.

STEPS TAKEN TO INCREASE RESPONSE RATES

A number of strategies were used to maximize response to the 3-month survey that included incentives, reminders, and different survey administration procedures. The initial survey was mailed directly to participants and enclosed a stamped return envelope. On the front of the survey, a chance at winning a \$100 lottery prize for returning completed surveys was offered. A winner was randomly chosen once a month, and an insert listing winners' names accompanied 3-month survey mailings. One week after mailing the survey, a postcard was automatically sent that reminded participants to return their surveys and restated the chance to win \$100.

Two weeks after sending the initial mailed survey, trained telephone surveyors attempted to contact nonrespondents at their commands to conduct a slightly shortened version of the survey over the phone. Telephone surveyors continued their attempts to complete the phone survey for 2 weeks and of-

ferred participants a chance at winning \$100 for completing the survey over the phone. An additional strategy was used to administer surveys to nonrespondents who were attending Hospital Corps school in Great Lakes, Illinois. Because a substantial number of recruits attend this school after leaving basic training, because telephone surveys were difficult to conduct at this command, and because an on-site research assistant (RA) was available at Great Lakes, there was an opportunity to administer 3-month surveys face-to-face in small group settings. Research staff would send the RA a list of participants who had not yet completed surveys and who were attending Hospital Corps school. The RA would notify these individuals and arrange to conduct the survey face-to-face in small group settings at Hospital Corps school.

Six weeks after the initial mailed survey had been sent, a brief postcard version of the survey with a few critical items was mailed to those who had not yet completed a survey as a final attempt to collect information. Once again, a chance at winning \$100 was offered for completing the postcard survey. As a result of these varied efforts, 3-month survey data could have been collected by four different means: (a) initial mailed survey, (b) telephone survey, (c) face-to-face group administration, and (d) brief postcard survey.

MEASURES

Study participants were categorized into one of five response groups: (a) those responding on-time to the initial mailed follow-up survey, (b) those administered the telephone survey, (c) those administered the survey face-to-face, (d) those responding to the brief postcard survey, and (e) nonrespondents. Those responding to the telephone, face-to-face, or brief postcard surveys were considered reluctant respondents.

Response groups were compared on a variety of demographic and smoking variables measured at baseline upon entry into basic training. Demographic characteristics included age, race/ethnicity, and education. Baseline smoking variables, most of which were set within the timeframe prior to recruit training, included past-month smoking prevalence (yes versus no), and type of smoker (experimenter, occasional, daily, or former). Several measures of baseline nicotine dependence including age one first started smoking regularly, number of cigarettes smoked on a typical day, and how soon after waking one usually had her first cigarette. Intentions to smoke after leaving basic training and the extent to which "you see yourself as someone who smokes a year from now" were measured on a scale ranging from 1 (*definitely*

no) to 4 (*definitely yes*). Cessation history was measured by three variables that addressed ever having tried to quit (yes versus no), duration of last quit attempt in days, and number of times one's tried to quit in the 12 months prior to basic training.

RESULTS

Those recruits reporting any experience with smoking at entry to recruit training were sent a 3-month follow-up survey. Approximately 39% ($n = 1,072$) of those still thought to be in the navy and eligible for follow-up ($n = 2,783$) completed the survey by one of the four administration modes. Table 2 presents the response rates and costs associated with the stepped approach. About 17% returned the initial mailed survey, a response rate comparable to those (11%-17%) reported for one-time opinion surveys sent to lower ranking navy-enlisted personnel (Kantor, Ford, and Heron 1996; Kantor, Ford, and Olmstead 1997). Other administration strategies and versions of the survey were useful in capturing an additional 22% of participants, with the telephone being particularly effective (13.7%).

Table 3 presents response group comparisons on demographic and baseline smoking variables. To compare groups on demographic and baseline smoking variables, chi-square analysis were conducted for categorical demographic and smoking variables, and one-way ANOVAs were conducted for interval/ratio level variables. Analyses showed that the five groups did not differ significantly with regard to age, race/ethnicity, measures of nicotine dependence, intentions to smoke, or cessation history. Significant group differences were found only for education, type of smoker, smoking prevalence, and whether one sees oneself as a smoker in a year. Further analyses were conducted on these variables to determine which response groups differed from one another. Analyses showed that respondents to the initial mailed survey did not differ from reluctant respondents on these variables. However, when respondents to any form of the survey were combined and compared to nonrespondents, analysis showed statistically significant differences. Compared to respondents, nonrespondents had less education ($\chi^2 = 14.12, df = 2, p \leq .001$), had a higher smoking rate at entry to basic training ($\chi^2 = 7.49, df = 1, p \leq .01$), were more likely to be daily smokers ($\chi^2 = 12.69, df = 4, p \leq .01$), and were more likely to see themselves as a smoker in the future, [$t(2770) = 3.75, p \leq .001$].

TABLE 2: Response Rates and Costs Associated With Stepped Approach to Increasing Survey Response Rates

Survey Administration Mode	Number Completing Survey	Response Rate (% of targeted)	Additional Cost per Targeted Respondent (\$)	Total Cost per Targeted Respondent (\$)
Initial mailed survey	469	16.9	—	1.21
Telephone survey	382	13.7	2.30	3.51
Face-to-face survey	57	2.0	5.00	8.51
Postcard survey	164	5.9	.75	9.26
Total respondents	1,072	38.5	—	4.21*

a. Weighted average of cost per targeted respondent.

COSTS ASSOCIATED WITH RESPONSE ENHANCEMENT STEPS

In assessing the costs associated with different survey administration methods, we did not include one-time costs (e.g., graphics production) or routine ongoing efforts (e.g., staff time for production of mailing labels, data processing). To calculate the costs of the initial survey mailing to all eligible follow-up participants, we included postage and cost of survey printing, reminder postcards, and inserts. Additional costs associated with enhancement steps were then calculated and included surveyor time, additional printing, and postage. These additional costs were based on the number of participants targeted to receive each mailing.

Table 2 presents the cost for the initial survey and each step taken to increase the response rate. An initial mailed survey cost \$1.21. It cost an additional \$2.30 per targeted participant to conduct the survey by telephone, and this method increased the response rate by 13.7 percentage points. Face-to-face administration of the survey was costly relative to other methods, with an additional cost of \$5 per targeted respondent. The final survey strategy, the brief postcard survey, cost an additional \$.75 per targeted respondent and increased the response rate by another 5.9 percentage points.

CONCLUSION

Results showed that steps taken in the present study to increase survey response rates among navy-enlisted women were successful. Had no tele-

phone, face-to-face, or postcard surveys been administered, response rates would have been as low (17%) as that typically seen in other navy personnel surveys. Telephone calls in particular appeared to be useful. Although they were almost twice as costly to conduct as the initial mailed survey, they increased the response rate by about 14 percentage points. Face-to-face surveys were by far the most expensive and this strategy is probably not feasible in most survey research studies.

Analysis showed that the characteristics of those who responded to various forms of the survey did not differ significantly in terms of demographic characteristics or baseline smoking levels. This finding was somewhat surprising, because difficult-to-reach or reluctant respondents might be expected to differ from those who responded promptly to the initial mailed survey (Cottler et al. 1987). Few studies have actually investigated differences in those who respond promptly to assessments versus reluctant respondents. At least a few studies have found on-time and reluctant respondents to be similar in terms of demographics and health behaviors and attitudes, although non-compliers were found to be at greater risk than on-time and reluctant compliers (Guadagnoli and Cunningham 1989; Siemiatycki and Campbell 1984; Frack et al. 1997). This finding may be encouraging for those who are able only to conduct a one-time mailed survey, in that prompt respondents might provide accurate, representative information and estimates even without data from those captured by more expensive follow-up strategies.

On the other hand, present results showed that those who did not respond at all were different from those responding to some form of the survey in ways documented in other studies. Noncompliers in longitudinal survey studies are often found to be at greater risk demographically (e.g., lower education) and in terms of their health attitudes, behavior, and status than those who comply (Frack et al. 1997; Biglan et al. 1991; Slymen et al. 1992; Given et al. 1990; Hansen et al. 1985; Kramer, Jeffery, and Snell 1986; Marmor et al. 1991; Cottler et al. 1987).

These results will be useful for those conducting surveys to describe and evaluate navy programs. There are approximately 500,000 enlisted personnel in the navy alone. The military is downsizing and is concerned about decrements in readiness and morale. Mailed surveys are playing an increasing role in monitoring personnel issues, attitudes, health, job-related factors, and quality of life. Results are not limited, however, to young enlisted navy personnel. Results seen here could well apply to survey efforts with other hard-to-reach populations, including young, multiethnic, relatively unskilled, at-risk, and lower socioeconomic groups.

TABLE 3: Comparison of Respondents, Reluctant Respondents, and Nonrespondents to a Smoking Survey for Newly Enlisted Navy Women

Women		Percentage, Mean, or Median					
Baseline Characteristics	Respondents to Initial Mailed Survey	Reluctant Respondents			Nonrespondents	χ^2 or F	
		Phone Survey	Face-to-Face Survey	Postcard Survey			
Age (mean)	19.8	19.5	19.3	19.9	19.8	1.8	
Race/ethnicity (percentage)							
White, non-Hispanic	70.9	75.5	68.4	68.1	70.3		
Black	10.9	8.2	8.8	9.8	11.9		
Hispanic	13.0	10.0	12.3	13.5	12.4		
Asian/Pacific Islander	3.6	2.6	7.0	4.9	3.4		
Native American	1.7	3.7	3.5	3.7	2.1	9.4	
Education (percentage)							
Less than high school	4.7	4.7	1.8	3.7	7.4		
High school	84.9	86.4	93.0	86.5	85.4		
More than high school	10.4	8.9	5.3	9.8	7.2	17.4*	
Past-month smoking (percentage)	71.4	77.0	62.5	74.4	78.0	15.2*	
Type of smoker (percentage)							
Experimenter	26.4	19.6	26.3	24.4	19.5		
Occasional	20.0	25.9	22.8	21.3	20.8		
Daily	45.7	49.5	42.1	49.4	54.1		
Former	7.4	5.0	8.8	4.9	5.5	25.4*	
Age first started smoking fairly regularly (mean)	15.7	15.8	15.5	15.8	15.8	0.4	
Cigarettes smoked per day (median range)	6-10	6-10	6-10	6-10	6-10	1.4	
Minutes after waking have first cigarette (median range)	31-60	31-60	31-60	31-60	31-60	1.1	
Intentions to smoke (mean)	2.0	2.1	1.9	2.0	2.1	1.8	
See oneself as a smoker in 1 year (mean)	1.8	1.9	1.9	1.9	2.0	3.7*	
Ever tried to quit (percentage)	68.1	69.6	68.1	68.1	62.8	8.8	
Duration of last quit attempt in days (median range)	8-29	8-29	8-29	8-29	8-29	1.1	
Number of times quit in prior 12 months (mean)	1.8	1.7	1.6	1.8	1.5	1.9	

* $p \leq .05$.

REFERENCES

- Armstrong, J.S., and E. J. Lusk. 1987. Return postage in mail surveys: A meta-analysis. *Public Opinion Quarterly* 51:233-48.
- Armstrong, B. K., E. White, and R. Saracci. 1992. *Principles of exposure measurement in epidemiology*. London: Oxford University Press.
- Biglan, A., D. Hood, P. Brozovsky, L. Ochs, D. Ary, and C. Black. 1991. Subject attrition in prevention research. (DHHS Publication No. ADM 91-1761). In *Drug abuse prevention intervention research: Methodological issues*, edited by C. G. Leukefeld and W. J. Bukoski. *National Institute on Drug Abuse Research Monograph Series* 107:213-34.
- Bray, R. M., L. A. Kroult, S. C. Wheelless, M. E. Marsden, S. L. Bailey, J. A. Fairbank, and T. C. Harford. 1995. *1995 Department of Defense survey of health related behaviors among military personnel*. Research Triangle Park, NC: Research Triangle Institute.
- Conway, T. L., S. I. Woodruff, C. C. Edwards, J. P. Elder, S.-H. Zhu, L. K. Hervig, and S. L. Hurtado. 1996. Operation stay quit: Smoking relapse prevention for navy women recruits. *The Health Psychologist* 18 (2): 4-5.
- Cottler, L. B., J. F. Zipp, L. N. Robins, and E. L. Spitznagel. 1987. Difficult-to-recruit respondents and their effect on prevalence estimates in an epidemiologic survey. *American Journal of Epidemiology* 125 (2): 329-39.
- Fox, R. J., M. R. Crask, and J. Kim. 1988. Mail survey response rate: A meta-analysis of selected techniques for inducing response. *Public Opinion Quarterly* 52:467-91.
- Frack, S. A., S. I. Woodruff, J. Candelaria, and J. P. Elder. 1997. Correlates of compliance with measurement protocols in a Latino nutrition-intervention study. *American Journal of Preventive Medicine* 13 (2): 131-36.
- Given, B. A., L. J. Keilman, C. Collins, and C. W. Given. 1990. Strategies to minimize attrition in longitudinal studies. *Nursing Research* 39:184-86.
- Guadagnoli, E., and S. Cunningham. 1989. The effects of nonresponse and late response on a survey of physician attitudes. *Evaluation & the Health Professions* 12 (3): 318-28.
- Hansen, W. B., L. M. Collins, D. K. Malotte, C. A. Johnson, and J. E. Fielding. 1985. Attrition in prevention research. *Journal of Behavioral Medicine* 8:261-75.
- Harlow, B. L., E. C. Crea, M. A. East, B. Oleson, C. J. Fraer, and D. W. Cramer. 1993. Telephone answering machines: The influence of leaving messages on telephone interviewing response rates. *Epidemiology* 4 (4): 380-3.
- Hopkins, K. D. 1992. Response rates in survey research: A meta-analysis of the effects of monetary gratuities. *Journal of Experimental Education* 61 (1): 52-62.
- James, J. M. 1992. Large monetary incentives and their effect on mail survey response rates. *Public Opinion Quarterly* 56 (4): 442-53.
- Kamens, D. R., K. M. Hiliopoulos, C. B. Morn, A. C. Zau, C. M. Anderson, J. M. Major, R. L. Calderon, and G. C. Gray. May 1997. Strategies for increasing response rates in mail surveys. Poster presented at the 1997 Epidemiology and Biostatistics Exchange, San Diego, CA.
- Kantor, J., M. Ford, and J. E. Heron. April 1996. *Navy-wide Personnel Survey (NPS) 1995: Statistical tables for enlisted personnel*. TN-96-43. San Diego, CA: Navy Personnel Research and Development Center.
- Kantor, J., M. Ford, and M. Olmstead. February 1997. *Navy-wide Personnel Survey (NPS) 1996: Statistical tables for officers and enlisted personnel*. TN-97-5/6. San Diego, CA: Navy Personnel Research and Development Center.
- Kramer, F. M., R. W. Jeffery, and M. K. Snell. 1986. Monetary incentives to improve follow-up data collection. *Psychological Reports* 58:739-42.
- Kristal, A. R., E. White, J. R. Davis, G. Corycell, T. Raghunathan, S. Kinne, and T. K. Lin. 1993. Effects of enhanced calling efforts on response rates, estimates of health behavior, and costs in a telephone health survey using random-digit dialing. *Public Health Reports* 108 (3): 372-79.
- Marmor, J. K., S. A. Oliveria, R. P. Donahue, E. J. Garrahe, M. J. White, L. L. Moore, and R. C. Ellison. 1991. Factors encouraging cohort maintenance in a longitudinal study. *Journal of Clinical Epidemiology* 44:531-35.
- Morrison, T. C., D. R. Wahlgren, M. F. Hovell, J. Zakarian, S. Burkham-Kreiner, R. Hofstetter, D. J. Slymen, K. Keating, S. Russos, and J. A. Jones. 1997. Tracking and follow-up of 16,915 adolescents: Minimizing attrition bias. *Controlled Clinical Trials* 18:383-96.
- Perneger, T. V., J.-F. Etter, and A. Rougemont. 1993. Randomized trial of use of a monetary incentive and a reminder card to increase the response rate to a mailed health survey. *American Journal of Epidemiology* 138:714-22.
- Pottick, K. J. 1991. Maximizing survey response rates for hard-to-reach inner-city populations. *Social Science Quarterly* 71 (1): 172-80.
- Siemiatycki, J., and S. Campbell. 1984. Nonresponse bias and early versus all respondents in mail and telephone surveys. *American Journal of Epidemiology* 120 (2): 291-301.
- Slymen, D. J., J. A. Drew, B. L. Wright, J. P. Elder, and S. J. Williams. 1992. Compliance with a 12-month assessment in an elderly cohort participation in a preventive intervention study: The San Diego Medicare Preventive Health Project. *International Journal of Epidemiology* 21 (4): 701-6.
- Tambor, E. D., G. A. Chase, R. R. Faden, G. Geller, K. J. Hofman, and N. A. Holtzman. 1993. *American Journal of Public Health* 83:1599-1603.
- Urban, N., G. L. Anderson, and A. Tseng. 1993. Effects of response rates and costs of stamps vs business reply in a mail survey of physicians. *Journal of Clinical Epidemiology* 46 (5): 455-459.
- Susan I. Woodruff, Ph.D., earned her Ph.D. in epidemiology from the University of California, San Diego/San Diego State University. She currently serves as principal investigator or coinvestigator on several longitudinal studies of effective smoking cessation intervention. She has more than 13 years of research experience primarily as an evaluator of tobacco use interventions targeting adolescents and underserved populations.
- Christine C. Edwards, M.P.H., has extensive experience in the field of tobacco control and has served as project manager on tobacco-related research projects for the past 10 years. In addition to project management, she has been involved in developing innovative interventions for smoking cessation and prevention. She earned her M.P.H. from San Diego State University.
- Terry L. Conway, Ph.D., is a research assistant professor with the Graduate School of Public Health at San Diego State University. She is the principal investigator on several large health intervention studies and has more than 15 years of experience in tobacco research. She earned her Ph.D. in social/health psychology from the University of Michigan.

Evaluation of policies designed to reduce emissions of global warming gases will require valid data about in-use quantities of these gases' precursors. This article assesses the quality of available data for many significant precursors of CO₂ and methane in King County, Washington, which is an area with minimal variations in climate as well as rapid population growth and development. Available data support an estimate of 21,000,000 metric tons of CO₂-equivalent gases emitted in 1990 from selected precursors. There is also evidence that electricity conservation programs and recycling both reduce CO₂ emissions. Requirements for adequate baseline data include constant and valid data definitions as well as monthly time series. To evaluate policies over periods of years, databases must be designed to withstand frequent and rapid changes in national economies; they must also permit analysis of consumer choices affecting fossil fuels and other precursors of warming gases. In almost every case, current data do not satisfy these requirements.

TC

get the journal delivered to your
e-mailbox!

HOME HELP FEEDBACK SUBSCRIPTIONS ARCHIVE SEARCH TABLE OF CONTENTS

Tob Control 1999;8:222-223 (Summer)

Letters to the editor

The United States navy attracts young women who smoke

EDITOR,—In the United States, smoking rates continue to be higher in male and female active duty military personnel than among their civilian counterparts.^{1 2} Other countries have similarly reported higher smoking rates among their military personnel.³ Several studies have investigated whether the United States navy "attracts" or "produces" smokers—that is, whether the higher prevalence of smoking among navy active duty personnel is due to self selection of smokers into the navy, or by navy institutional norms that promote smoking.^{1 4-9} Studies to date have had methodological limitations—for instance, small samples, limited age ranges, use of active duty personnel rather than new enlistees, or no adjustments for differences in civilian-military sociodemographic factors—and results have been conflicting. The present analysis addressed the "attracting" aspect of the question by studying a large sample of women as they entered the navy. The smoking rate of the navy recruit sample was compared with that of a large, representative civilian sample equated to the navy population in terms of age, race/ethnicity, and education using a direct standardisation procedure.¹⁰

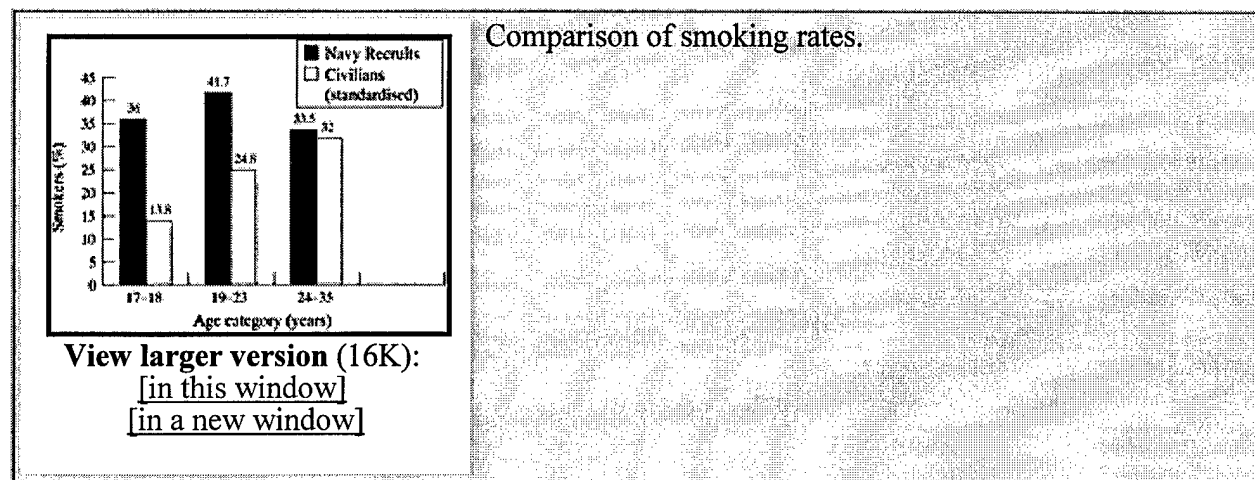
During a one-year period, all female recruits (n = 5503) completed smoking surveys as they entered the navy. Refusals were virtually nonexistent. Civilian data were obtained from the tobacco use supplement (TUS) to the 1992-1993 United States Bureau of the Census' current population survey.¹¹ Almost 63 000 unweighted cases were extracted from the TUS for women between the ages of 17 and 35 years to correspond with the complete age range of the navy recruit sample. Software for survey data analysis (SUDAAN)¹² was used to weight and standardise the civilian data to the joint distribution of the navy recruit sample in terms of education and race/ethnicity, and then comparisons were made within three age strata. Estimates for civilians can be interpreted as those that would be obtained if the civilian population had had the same sociodemographic distribution as the navy recruit population. For recruits and civilians, current smoking was defined as having smoked 100 cigarettes in one's life and being an everyday or someday smoker.

The comparison of current smoking between navy women recruits and civilian women, stratified by age category, is presented in the figure. Comparisons for women aged 17-18 years and those aged 19-23 years were statistically significant, with navy women recruits having higher rates of current smoking in both of these age strata. Navy women recruits who were 17-18 years old had over 21/2 times the smoking rate of civilians, and women aged 19-23 had over 11/2 times the rate of civilians. Smoking rates were not significantly different for recruits and civilians in the 24-35 age range.

Although this analysis cannot rule out the role that the navy environment may play in "producing" smokers, it provides more definitive evidence that the navy attracts young female smokers from the outset. Further, this high rate of smoking cannot be accounted for by sociodemographic characteristics. The specific factors that might account for the high rate of smoking among women entering the navy are not known. Certain "unconventional" personality factors and behaviours including risk taking, sensation

- ▶ eLetters: [Submit a response to this article](#)
- ▶ Search Medline for articles by:
[WOODRUFF, S. I](#) || [ELDER, J. P](#)
- ▶ Collections under which this article appears:
Public Health:
Smoking

seeking, rebelliousness, and self confidence have been associated with smoking in young women,^{13 14} and perhaps these same characteristics are associated with enlisting in the military. In addition, there may be differences in geographical location and family/peer patterns of tobacco use between women who choose to join the navy and the general population. Additional work is needed to explore reasons for the high rate of smoking among incoming military recruits to inform strategies for effective cessation.



SUSAN I WOODRUFF, TERRY L CONWAY, CHRISTINE C EDWARDS, JOHN P ELDER
 Graduate School of Public Health, San Diego State University, 9245 Sky Park Ct, Ste 120, San Diego, California 92123, USA; swoodruf@mail.sdsu.edu

Acknowledgments

This research was supported by the Department of Defense (DoD) Women's Health Research Program (DAMD17-95-5075). This project was approved by the Human Use committees of the United States Army Medical Research and Material Command and San Diego State University. The authors gratefully acknowledge the contributions of Suzanne L Hurtado, Linda K Hervig, Shu-Hong Zhu, and Kathleen B Weaver.

References

1. Bray RM, Marsden ME, Peterson MR. Standardized comparisons of the use of alcohol, drugs, and cigarettes among military personnel and civilians. *Am J Public Health* 1991;**81**:865-869[[Medline](#)].
2. Bray RM, Kroutil LA, Wheelless SC, et al. 1995 *Department of Defense survey of health related behaviors among military personnel*. Research Triangle Park, North Carolina: Research Triangle Institute, 1995.
3. Arciti C, Pistone M, Persici P, et al. Ten years of anti-smoking programs in Italy: a review. *Am J Health Prom* 1995;**9**:190-200[[Medline](#)].
4. Cronan TA, Conway TL. Is the Navy attracting or creating smokers? *Mil Med* 1988;**153**:175-178[[Medline](#)].
5. Conway TL. Tobacco use in the United States military: a longstanding problem. *Tobacco Control* 1998;**7**:219-221[[Full Text](#)].
6. Haddock CK, Klesges RC, Talcott GW, et al. Smoking prevalence and risk factors for smoking in a population of United States Air Force basic trainees. *Tobacco Control* 1998;**7**:232-235[[Abstract/Full Text](#)].
7. Chisick MC, Poindexter FR, York AK. Comparing tobacco use among incoming recruits and military personnel on active duty in the United States. *Tobacco Control* 1998;**7**:236-240[[Abstract/Full Text](#)].
8. Cronan TA, Conway TL, Kaszas SL. Starting to smoke in the Navy: when, where and why? *Soc Sci Med* 1991;**33**:1349-1353[[Medline](#)].
9. Weaver KB, Woodruff SI, Conway TL, et al. Does the US Navy attract young women who smoke? *Occup Environ Med* 1998;**55**:792-794[[Medline](#)].
10. Kalton G. Standardization: a technique to control for extraneous variables. *Appl Stat* 1968;**23**:118-136.
11. Hansen RH. *The current population survey: design and methodology*. Technical paper no 40. Washington, DC: US Department of Commerce, Bureau of the Census, 1985.
12. SUDAAN (software for survey data analysis) v5.30 manual. Research Triangle Park, North Carolina: Research Triangle Institute, 1989.
13. Killen JD, Robinson TN, Haydel KF, et al. Prospective study of risk factors for the initiation of cigarette smoking. *J Consult Clin Psychol* 1997;**65**:1011-1016[[Medline](#)].
14. Clayton S. Gender differences in psychosocial determinants of adolescent smoking. *J Sch Health* 1991;**6**:115-120.

© 1999 by Tobacco Control

► **eLetters:** Submit a response to this article

► Search Medline for articles by:
[WOODRUFF, S. I](#) || [ELDER, J. P](#)

► Collections under which this article appears:
Public Health:
[Smoking](#)

[HOME](#) [HELP](#) [FEEDBACK](#) [SUBSCRIPTIONS](#) [ARCHIVE](#) [SEARCH](#) [TABLE OF CONTENTS](#)

Operation Stay Quit: Preventing Smoking Relapse Among US Navy Women

Christine C. Edwards, MPH; Susan I. Woodruff, PhD; Terry L. Conway, PhD

Objective: To test a smoking relapse prevention program for Navy women recently graduated from recruit training. **Methods:** Motivational materials were mailed to women at critical relapse points following recruit training graduation. Smoking was assessed at 6 months post-graduation through a self-report sur-

vey. **Results:** A higher proportion of women exposed to the mail intervention had tried to quit smoking, although there were no significant differences in the overall relapse rate between intervention and control groups. **Conclusion:** The smoking relapse prevention tested did not succeed.

Am J Health Behav 1999;23(5):352-355

Studies have shown that US Navy women are more likely to smoke than their civilian counterparts with smoking rates reported as high as 35-50%.¹⁻³ Women constitute approximately 13% of enlisted US Navy personnel.⁴ As the numbers and roles of women in the military expand, it is of critical importance to reduce their smoking prevalence and the smoking-related adverse effects on physical readiness, health, medical care costs, and the health of their children.

All women who enlist in the Navy enter the Recruit Training Command (RTC) at Great Lakes, IL where they undergo 8 weeks of basic military training. The period of recruit training is unique in that all smokers are subject to an organi-

zationally mandated period of cessation. At the RTC, smoking is strictly prohibited 24 hours a day for the 8 weeks of recruit training. Thus, all smokers are forced to quit "cold turkey" and remain quit for almost 2 months. It is tempting to believe that these women recruits have successfully passed a critical period and, therefore, would be less likely to relapse upon leaving RTC. Without support, however, an overwhelming majority of enlisted Navy women immediately return to smoking after they leave RTC.⁵ In response to this problem, Operation Stay Quit (OSQ) was funded through the Defense Women's Health Research Program to test an innovative approach to prevent smoking relapse among enlisted Navy women once they leave RTC. The purpose of this large field trial was to examine the effectiveness of different relapse-prevention strategies for women recently graduated from RTC. This paper focuses on the results of a mailed motivational materials intervention in comparison to a control group who received no mailed materials. This mail intervention was developed as a convenient, nonobtrusive, and relatively easy method for reaching young women who are fairly transient and unable to

Christine C. Edwards, MPH, Project Manager; Susan I. Woodruff, PhD, Co-investigator; Terry L. Conway, PhD, Principal Investigator, Operation Stay Quit, San Diego State University, San Diego, CA.

Address correspondence to Ms. Edwards, Operation Stay Quit, San Diego State University, Graduate School of Public Health, 9245 Sky Park, Court, Suite 120, San Diego, CA. Email: cedwards@mail.sdsu.edu

attend group or face-to-face counseling programs.

METHODS

Participants and Setting

Study participants consisted of volunteers from among all female recruits entering the US Navy between March 1996 and March 1997 (12 consecutive months). These women were randomly assigned to control or intervention groups prior to leaving RTC after graduating from the 8-week period of recruit training.

Description of Mail Intervention

The intervention was based on a cognitive-behavioral approach that maintains that behavioral changes such as quitting smoking are primarily due to self-regulations and motivation.⁶⁻⁸ The mail intervention provided relapse-prevention support in the form of 6 modules mailed over a 12-month period, with more frequent contact during the first 4 months when relapse is most likely to occur. The intervention modules provided motivational and behavioral cues at critical relapse points without the need for face-to-face contact. The motivational materials focused on relapse issues that research has shown to be relevant to women, and particularly relevant to Navy women, such as fear of postquitting weight gain, coping with job stress, social support, and the perceived benefits of quitting. Each of the 6 intervention modules consisted of a colorful, one-page motivational flyer and a "behavioral cue" item. A brief description of the modules follows:

Module 1: Addressed stress-management techniques and skills for identifying potentially difficult situations that could trigger relapse. It included a foam "stress grip."

Module 2: Addressed the fear of weight gain and provided hints on staying fit within the Navy environment. It included several small boxes of chewing gum.

Module 3: Emphasized the economic benefits of not smoking. Women were provided with a small calculator.

Module 4: Discussed the process of quitting and the idea that becoming a nonsmoker takes time. It included a pen with a "tip" to write down alternative activities to smoking.

Module 5: Emphasized the importance of social support and identified strategies

Study participants consisted of volunteers from among all female recruits entering the US Navy...

for teaching others how to be supportive during the quitting process. A credit-card-sized address book accompanied the written material with a "tip" to keep a friend's phone number handy.

Module 6: Two versions of Module 6, the final module, were developed. For the women who had already quit smoking as identified on the 6-month survey, Module 6 emphasized that she was a *nonsmoker* and reminded her that she still might face difficult moments. A pocket mirror accompanied the written material with a "tip" to look in the mirror and look at the *nonsmoker*. For the women who were smoking at the 6-month survey, Module 6 identified rationalizations used to justify smoking and debunked those ideas. A pocket mirror accompanied the written material with a "tip" to look in the mirror and picture a nonsmoker.

Data Collection and Analyses

Initial analyses (Chi-square analysis and independent t-tests) were conducted on a number of sociodemographic and baseline smoking variables to determine the comparability of the mail-intervention and control groups. The groups were equivalent in terms of age, race/ethnicity, education, smoking rates, number of cigarettes smoked, and quit experiences at baseline.

Chi-square and independent t-tests were conducted on a number of 6-month follow-up measures to examine differences between the mail-intervention and control condition participants.

Recruits completed baseline surveys within the first 5 days of reporting to RTC. Multiple Navy data sources were used to locate and track study participants post-RTC graduation for the purpose of conducting the 6-month follow-up assessment. At least 2 attempts were made to deliver the surveys, based on any new address information, via the mail to all

TABLE 1
Comparison of 6-Month Follow-Up Measures Between Mail and Control Conditions

Follow-up Measure	% or Mean		p-value	Number of Respondents
	Control	Mail		
Past 30-day smoking prevalence (%)	63.0	61.0	ns	659
Since graduating from RTC have you tried to quit? (% yes)	64.0	72.0	.037	517
Strong intentions to quit in the next 6 months among those currently smoking (% yes)	58.0	64.0	ns	314
# of cigarettes in the past 30 days (mean category) ^a	2.2	1.9	ns	659
Among those who relapsed, # quit attempts since graduating from RTC (mean)	1.3	1.5	ns	409
Do you see yourself as a smoker one year from now? (mean) ^b	1.9	1.8	ns	529
^a Categories ranged from 0 (no cigarettes) to 10 (more than 40 cigarettes)				
^b Scale ranged from 1 (definitely yes) to 4 (definitely no)				

study participants. Strategies used to maximize the response rate to 6-month surveys included a chance to win a \$100.00 lottery prize, postcard reminders, and phone calls to participants to complete the survey over the phone.⁹ The response rate to the 6-month survey was 41% (n=661), a much higher percent than that typically seen among lower enlisted military personnel.^{10,11}

RESULTS

Ninety-three percent of eligible women (n=5503) provided consent and completed baseline surveys at the beginning of recruit training. In general, women recruits were young, with over 90% being less than 24 years of age. The mean age was 19 years (SD=2.75). The majority (85%) had exactly a high school education, 9% had more than a high school education, and 6% had less than a high school education. Recruits were ethnically diverse with 58% White non-Hispanic, 23% Black, 12% Hispanic, 4% Asian/Pacific Islander, and 2% Native American.

All female recruits who reported at

baseline (i.e., first week of RTC) any experience with smoking prior to entering the Navy composed the cohort of "smokers" to be surveyed 6 months after leaving RTC. Approximately 42% of entering women recruits were "smokers."

The mail intervention did not have a statistically significant impact on overall smoking rates, with past 30-day smoking prevalence at 61% in the mail-intervention condition and 63% in the control condition (Table 1). However, the intervention did seem to have some effect in the area of quit attempts. Of those who had relapsed since graduating from recruit training, significantly more women in the mail group had tried to quit again (72%) as compared to those in the control group (64%). Among those who had smoked in the past 30 days, more women in the mail condition had strong intentions to quit smoking in the next 6 months than did those in the control condition (64% vs 58% respectively), although the difference did not reach statistical significance. Analyses of other follow-up measures indicated that women in the mail-intervention condition had smoked slightly fewer

cigarettes in the past 30 days, had made slightly more quit attempts since graduating from RTC, and were slightly less likely to see themselves as smokers 1 year from now. However, group differences were small and did not reach statistical significance. Analyses were repeated based on the *type* of smoker (daily, occasional, experimenter, and former smoker) one was at baseline. The patterns of findings were similar to those shown in Table 1 combining all types of "smokers."

DISCUSSION

The mail motivational-materials intervention was not strong enough to produce a statistically significant difference in the overall relapse rate between women in the intervention group and those in the control group. The intervention appeared to have the most impact in the area of quit attempts and quit intentions. It is possible that the consistent reminders about quitting encouraged some women to keep considering and even trying to quit smoking. This finding is important because, for current smokers, repeated attempts to quit smoking and strong intentions to quit are important indicators of progress towards eventual success at quitting.¹²

There are several probable reasons that this intervention was not more effective with this population. The RTC smoking ban produces an involuntary and forced state of cessation. Many of these women may feel that they quit smoking because they had to, not because they chose to quit. Upon graduating from RTC, there may also be strong social influences to resume smoking, as personnel experience peer pressure and encouragement to take "smoke breaks" and socialize at various "smoking pits." The Navy could reinforce the quit status of new personnel by providing more opportunities for smoke-free socializing, even on the job. For example, supervisors could be strongly encouraged to support smoke-free lunch and work breaks. The highest ranks on down could more actively promote a work climate encouraging good health and physical fitness, and support the quit status achieved during recruit training.

This brief, nonobtrusive, and relatively low-cost intervention did promote quit attempts within the intervention group. It is possible that this type of brief inter-

vention would be more effective among a more motivated population in an organizational setting supportive of quitting. Strong leadership promoting a healthful work environment and positive health behaviors among military personnel might provide the climate in which a brief intervention, such as the one described here, might prove effective for reducing smoking rates. ■

REFERENCES

1. Bray R, Marsden M, Peterson M. Standardized comparisons of the use of alcohol, drugs, and cigarettes among military personnel and civilians. *Am J Public Health* 1991;81(7):865-869.
2. Pokorski T, Chen W, Pigg R, Dorman S. Effect of educational intervention on smoking prevalence of US Navy recruits. *Health Values* 1995; 19(5):48-55.
3. Bray R, Krout L, Wheelless S, Marsden M, Bailey S, et al. 1995 Department of Defense Survey of Health Related Behaviors Among Military Personnel (Contract No. DASW01-94-C-0140). Research Triangle Park: Research Triangle Institute.
4. Bureau of Naval Personnel. Women in the Navy - assignments. www.chinfo.navy.mil (September, 1998).
5. Hurtado S, Conway T. Changes in smoking prevalence following a strict no-smoking policy in U.S. Navy recruit training. *Military Medicine* 1996;161(1):571-576.
6. Marlatt G, Gordon J. Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behavior. New York: Guilford Press. (1985).
7. Baumeister R, Heatherton T, Tice D. Losing Control: How and Why People Fail at Self-Regulation. San Diego: Academic Press, 1994.
8. Leventhal H, Cleary P. The smoking problem: a review of research and theory in behavioral risk modification. *Psychological Bulletin* 1980;88:370-405.
9. Woodruff S, Edwards C, Conway T. Enhancing response rates to a smoking survey for enlisted U.S. Navy women. *Evaluation Review* 1998;22(6):780-791.
10. Kantor J, Ford M, Heron J. Navy-wide Personnel Survey (NPS) 1996: Statistical tables for enlisted personnel (Technical note no. 96-43). San Diego, CA: Navy Personnel Research and Development Center. (April, 1996).
11. Kantor J, Ford M, Olmstead M. Navy-wide Personnel Survey (NPS) 1996: Statistical tables for officers and enlisted personnel (Technical note no. 97-5/6). San Diego, CA: Navy Personnel Research and Development Center. (February, 1997).
12. Pierce J, Evans N, Farkas A, Cavin S, Berry C, et al. Tobacco Use in California. An Evaluation of the Tobacco Control Program, 1989-1993. La Jolla, CA: University of California, San Diego; 1994.

Effect of an 8-week Smoking Ban on Women at US Navy Recruit Training Command

Susan I. Woodruff, PhD, Terry L. Conway, PhD, and Christine C. Edwards, MPH

Affiliation: San Diego State University, Graduate School of Public Health

Key words: smoking, military, women, smoking ban

Corresponding author: Susan I. Woodruff, SDSU, GSPH, 9245 Sky Park Court, Suite 120, San Diego, California 92123. Phone: (619) 594-2787, FAX: (619) 594-3143, email: swoodruf@mail.sdsu.edu

Under Review

Effect of an 8-week Smoking Ban on Women at US Navy Recruit Training Command

Susan I. Woodruff, Terry L. Conway, and Christine C. Edwards

Abstract

Objective: To examine the effect of a unique organizational smoking ban on female U.S. Navy recruits—a population that historically has had high smoking rates.

Setting and Design: Study participants were female recruits (n=5,503) entering the U.S. Navy recruit training command between March 1996 and March 1997 (12 consecutive months). Participants completed smoking surveys at entry to recruit training (i.e., baseline) and again at graduation from training after exposure to an eight week, 24-hour-a-day smoking ban. Effects of the ban on baseline-to-graduation changes in perceptions of being a smoker were examined, and relapse rates among baseline ever smokers was assessed three months after leaving recruit training.

Results: As a result of the ban, there was a significant reduction (from about 41% to 25%) in the percent of all women recruits who reported themselves as smokers, a much larger change than expected had no ban been in place. Relapse at the 3-month follow-up varied by the type of smoker one was at entry into the Navy, with rates ranging from 89% relapse among baseline daily smokers to 31% among baseline experimenters.

Conclusions: Findings suggest that the ban provides some smokers who desire to quit with an external impetus and support to do so. However, high relapse rates indicate that more than an organizationally-mandated smoking ban during recruit training is needed to help younger smokers, more regular smokers, and those who intend to continue smoking to quit after joining the Navy.

Effect of an 8-week Smoking Ban on Women at US Navy Recruit Training Command

Tobacco use is of particular concern to the Department of Defense (DoD) because the military has historically had higher and heavier rates of tobacco use than civilians¹ and because of the adverse effects of smoking on personnel health and performance.²⁻³ Although smoking in the military has decreased dramatically since 1980,⁴ the prevalence continues to be well above the Healthy People 2000 goal of 20% for the military⁵ as well as above civilian rates. In addition, studies show high rates of smoking persist even after discharge from military service.⁶⁻⁷ Of particular concern to the DoD, a study comparing substance use in standardized samples of civilians and military personnel concluded that military *women* are more likely to smoke and to smoke heavier than their civilian counterparts.¹ Smoking can be especially damaging during the reproductive years when cigarette use can have a negative impact on pregnancy and the health of the unborn child, the newborn, and young children exposed to secondhand smoke.⁸⁻⁹

Military smoking rates have declined in recent years due at least in part to military health promotion efforts, yet increased support for cessation is needed to further reduce smoking rates.¹⁰ Few studies have examined smoking cessation among older adolescents, the typical age of women and men who join the military. The data reviewed indicate that adolescent smokers frequently try to quit, but are usually not successful.¹¹⁻¹³ Even more discouraging, cognitive-behaviorally oriented cessation interventions that have been effective with adults have not shown much promise when tried with adolescents.¹⁴⁻¹⁵ The

absence of effective intervention for young smokers is cause for concern, since adolescent smokers will likely become adult smokers.

Correlational and econometric studies show that restrictive smoking regulations at work have a significant effect on cigarette consumption.¹⁶⁻¹⁷ The effect appears to be even stronger for young smokers than for adults¹⁸ probably by realigning normative perceptions of smoking and by reducing convenient opportunities to smoke.¹⁵ In the military, comprehensive DoD and Navy-specific policies have been implemented that address the prevention and reduction of smoking by mandating smoke-free work places and cessation support for personnel.¹⁹⁻²⁰ The Navy, for example, now prohibits tobacco use at recruit training command for the eight-week duration of basic training which all new recruits undergo upon entering the Navy.

The smoke-free policy at the Navy recruit training command is unique among worksite policies because it is enforced the entire eight-week period of "live-in" training, in contrast to workplace smoking policies that can only be enforced during working hours. Furthermore, the military environment, having a strong authoritarian component, can mandate compliance, thereby reducing the probability of "cheating." The impact of this type of intense tobacco restriction on women's short- and longer term smoking status is unknown.

The present study examines the short-term effect of the recruit smoking ban on women's smoking status. Specifically, two questions are investigated: (1) after exposure to the recruit training command (RTC) 24-hour-per-day no-smoking policy (i.e., mandatory "cold turkey" cessation for eight weeks), do a significant number of women

who smoked when they entered the Navy modify their self-perception as smokers and report that they are non- or former smokers at the end of recruit training, and (2) what percent of women smokers relapse into smoking within *three months* after having spent an 8-week period of mandatory cessation?

METHODS

Participants

Study participants consisted of volunteers from among all female recruits entering the Navy RTC at Great Lakes, Illinois, between March 1996 and March 1997 (12 consecutive months). Over the course of the year, 5,503 women provided consent and completed Entry (i.e., baseline) smoking surveys—93% of those eligible based on counts of recruits provided by RTC rosters. Refusals to provide consent and complete the Entry survey were virtually nonexistent; the 7% of women not completing Entry surveys failed to primarily because of scheduling conflicts. Near the time of graduation from RTC, 4,411 women completed Graduation surveys, 86% of those still at RTC. Virtually no recruit refused to complete Graduation surveys; nonresponse to the Graduation survey was almost entirely due to scheduling conflicts.

Table 1 presents sociodemographic characteristics of women entering the Navy over the one-year period. In general, women recruits were young, with over 90% being less than 24 years of age. The mean age was 19 years ($SD=2.75$). The majority (85%) had exactly a high school education. Recruits were ethnically diverse, with 42% belonging to ethnic groups other than White non-Hispanic.

Insert Table 1 about here

Data Collection

Recruits completed Entry smoking surveys within the first days of reporting to RTC, and completed Graduation surveys about eight weeks later just prior to graduation from RTC. Recruits who reported on the Entry survey that they were ever smokers (i.e., daily smokers, occasional smokers, experimenters, or former smokers) comprised the follow-up study group of “smokers” who were mailed a 3-month post-graduation follow-up survey to assess smoking relapse. The rationale for the inclusive, liberal definition of “smokers” was based on previous studies of Navy personnel that suggest that former smokers at entry, and even those who had even experimented with smoking, may be at risk for smoking regularly once joining the Navy.^{1,21}

This study used several Navy data sources to locate and track study participants after graduation from RTC for the purpose of conducting the 3-month post-graduation smoking survey. At least two attempts were made to deliver the 3-month surveys to “smokers”. A number of strategies were used to maximize response to the 3-month survey that included incentives, reminders, and different survey administration procedures.²² The response rate to the 3-month survey was 39%, a higher percent that that typically seen among lower enlisted military personnel.²³⁻²⁴

Measures

Perceptions of being a Smoker: Self-reports of being a smoker was the primary dichotomous variable of interest, although the definition differed at graduation from that used at entry and the 3-month follow. Self-reports of any smoking within the 30 days prior to RTC designated the individual as a smoker at entry. Because of the ban during RTC, smoking at graduation necessary was based on *perceptions* of being a smoker rather than on reports of actual behavior. The graduation survey item, "How would you currently describe yourself," provided the following response options to all recruits: (1) never smoked, (2) non-smoker/former smoker, or (3) smoker, even though not allowed to smoke during training. The first two categories were combined to represent those recruits who classified themselves as non-smokers at the end of training, and those choosing the last response were considered smokers at the end of training. On the 3-month post-graduation survey, self-reports of smoking within the last 30 days designated the individual as a smoker at follow-up.

Predictor Variables: A number of sociodemographic and entry smoking variables were examined as correlates of entry-to-graduation changes in perceptions of being a smoker. These included (a) age group (17-18 years, 19-23 years, and 24-35 years of age), (b) race/ethnicity (White non-Hispanic, Black non-Hispanic, Hispanic, Asian/Pacific Islander, and Native American), (c) education (less than a high school education, high school, and greater than a high school education), (d) the individual's self-identified type of smoker (experimenter, occasional smoker, daily smoker, and former smoker at entry to RTC), (e) intentions to smoke after leaving RTC measured on a scale ranging from 1

(definitely no) to 4 (definitely yes), (f) number of cigarettes typically smoked per day during the 30 days prior to entering RTC, measured on a scale ranging from 1 (less than 1 cigarette on average) to 10 (more than 40 cigarettes), and (g) minutes after waking one typically had her first cigarette of the day during the 30 days prior to entering RTC, measured on a scale ranging from 1 (immediately) to 6 (more than 2 hours after waking). These last two variables are commonly used indicators of addiction to nicotine.²⁵⁻²⁶ This same set of predictors was used in an analyses of potential correlates of relapse at the 3-month follow-up, with the addition of two variables measured at graduation: (a) intentions to smoke after leaving RTC as measured at graduation, and (b) perceived smoking status at graduation (smoker vs. non/former smoker).

RESULTS

Among the 4,393 recruits who provided entry and graduation survey data on smoking, 41.4% (n=1,819) reported being smokers at entry (i.e., reported any smoking in the 30 days prior to entering RTC). As shown in Figure 1, 25% (n=1,110) of all women recruits reported being a smoker at graduation, a statistically significant reduction from the 41% smoking rate at entry into RTC (McNemar $\chi^2 = 665.7$, $p \leq .001$).

Insert Figure 1 about here

This change in perceptions of smoking status can better be interpreted by comparing it to changes that would have occurred without the 8-week ban on smoking

(see Figure 1). Just prior to the implementation of the smoking ban during recruit training, Cronan and colleagues²⁷ conducted a study of the relative effectiveness of several smoking prevention/cessation interventions with male recruits at RTC, San Diego.¹ Control group data from that study provide an estimate of changes in smoking status that one could expect given no smoking ban. Smoking prevalence among this small group of 101 men at entry was 19% and at graduation was 26.7%, a statistically significant *increase* in the proportion of current smokers (McNemar exact test for correlated proportions, two-tailed, $p \leq .05$). Although the definition of smoking, the sex of the recruits, a 10-year time period, and the geographic location of training differed in the present study and the Cronan et al. study,²⁷ the differences in the direction and magnitude of change make a compelling case for the effect of the 8-week ban in changing self-reports of one's smoking status.

Figure 2 presents more specific information about how entry smokers viewed themselves at graduation. Approximately 60% of those reporting they had smoked in the 30 days prior to RTC reported they were still smokers at graduation; 37% considered themselves non/former smokers at graduation. A small percent (2.3%, $n=42$) of entry smokers reported at graduation that they had never smoked.²

¹ RTC San Diego is presently closed. All Navy recruits, male and female, receive their basic training at Great Lakes, Illinois.

² These individuals were infrequent and very light baseline smokers (i.e., primarily experimenters) who, by graduation, categorized themselves as "never smokers."

Insert Figure 2 about here

Several sociodemographic and entry smoking variables were examined as potential predictors of perceived smoking status at graduation among entry “smokers”. Age, education, race/ethnicity, type of entry smoker, number of cigarettes typically smoked per day during the 30 days prior to RTC, minutes after waking one typically had her first cigarette of the day during the 30 days prior to RTC, and intentions to smoke after leaving RTC. All predictors were included in a stepwise logistic regression to determine the independent correlates of graduation smoking status. As shown in Table 2, race/ethnicity, type of smoker, number of cigarettes typically smoked, and intentions to smoke were independently related to smoking status at graduation. Relative to Whites, Blacks were significantly less likely to view themselves as smokers at the time of graduation. Entry occasional smokers were almost 3 times more likely, daily smokers were 7.60 times more likely, and former smokers were 4.45 times more likely than experimenters to perceive themselves as smokers at graduation. Greater number of cigarettes typically smoked and intentions to smoke after leaving RTC were both positively related to perceptions of oneself as a smoker at graduation.

Insert Table 2 about here

Relapse at the 3-month Follow-up

Figure 3 presents relapse rates based on past-30-day smoking reported at the 3-month follow-up. Slightly over two-thirds ($n=724$) of “smokers” who responded to the follow-up survey had resumed smoking 3-months after graduation, and 32% ($n=340$) reported not smoking. Among *past-month smokers at entry to RTC*, the relapse rate at the 3-month follow-up was 81%.

Insert Figure 3 about here

Sociodemographic characteristics, entry smoking variables, and graduation smoking variables were used in a multivariate logistic analysis to concurrently examine their association with relapse (yes versus no smoking during the past 30 days) at the 3-month follow-up. Race/ethnicity, education, intentions to smoke after RTC measured at entry, addiction level measured at entry (i.e., number of cigarettes typically smoked; minutes after waking one typically had her first cigarette of the day), and perceptions of being a smoker at graduation did not significantly predict relapse in the multivariate model. As shown in Table 3, age, type of smoker at entry, and intentions to smoke measured at graduation were associated with smoking relapse three months after leaving RTC. Younger recruits (less than 24 years of age) had higher relapse rates than their “older” counterparts. Relative to those considering themselves experimenters at entry, the odds of relapse were significantly higher for occasional ($OR=2.58$) and daily ($OR=5.31$) smokers, although the odds of relapse among former smokers did not differ significantly from that of experimenters. Figure 4 graphically shows the relapse rates by

type of entry smoker. Entering daily smokers had the highest relapse rate (89%), while experimenters had the lowest (31%). Those reporting they were occasional or former smokers at entry to RTC were smoking at the 3-month assessment in rates of 66% and 52%, respectively. Intentions to smoke was the final independent predictor of relapse at 3 months. At graduation, those who still had relatively strong intentions to smoke after leaving RTC more likely to relapse than those with weaker intentions.

Insert Table 3 about here

Insert Figure 4 about here

DISCUSSION

As a result of the 8-week smoking ban, there was a significant reduction (from about 41% to 25%) in the percent of all Navy women recruits who perceived themselves as smokers, a much larger change than one would expect had no ban been in place. Thirty-seven percent of past 30-day smokers at entry reported they were non-smokers by graduation. White non-Hispanics; occasional, former, and particularly daily baseline smokers; those more addicted to smoking based on the number of cigarettes they typically smoked; and greater intentions to smoke after leaving RTC were associated with a persistent view of oneself as a smoker, even after a lengthy period of abstinence.

Among all “smokers” followed, the past 30-day smoking rate three months after leaving recruit training was 68% (or a 32% cessation rate); 81% of those who had smoked in the 30 days prior to recruit training had relapsed at the 3-month follow-up (19% cessation rate). Identifying an appropriate group with which to compare these relapse rates is difficult for several important reasons. Studies differ in their definitions of smoking and cessation, their data collection timeframes, and, most important, their target study group. The present study focused on women experiencing protracted *involuntary* 24-hour-a-day abstinence from smoking. Ideal comparison data to assess the effects of the 8-week ban on subsequent smoking rates would be those from a longitudinal study of a representative sample of military women not exposed to the 8-week smoking ban during recruit training. Such a study could provide spontaneous quit rates that naturally occur during the first few months of naval service. Although such an investigation has not been conducted, a study of 682 men entering the Navy in the summer of 1987 before the RTC smoking ban had been implemented found that 6.8% reported being quit one year later.²¹ This figure was considered comparable to the 6% spontaneous community quit rate estimated by others.²⁸ A study conducted after the ban was in place reported a 19% cessation rate in 423 Navy men one year after they graduated from recruit training.²⁹ The authors concluded that the quit rate among those exposed to the smoking ban was sizably higher than a 6% spontaneous quit rate and comparable to one-year quit estimates reported across a variety of more costly cessation interventions.

The impact of the 8-week smoking ban can be compared to spontaneous cessation rates among civilians only with caution and appreciation for differences in study

populations and settings. Burns and Pierce retrospectively assessed spontaneous cessation activity in Californians.³⁰ Among adult females (18-65+ years of age), 12.5% of those who were smokers one year ago were non-smokers at the time of the interview. Others have reported somewhat similar adult cessation rates ranging from 8-10%.³¹ Naturally occurring quit rates among young people are generally thought to be as low or lower than adults' cessation rates, ranging from 0 to 11% over a 4 to 6 month period.³²⁻³³ For the most part, research has reported low cessation rates for adolescents that range from 3-5%.^{31,34}

Most of these investigations of cessation among civilians differ from the present study in one very important aspect: smokers in the comparison studies are usually individuals who are motivated to quit smoking. Those who self-initiate smoking cessation or volunteer to be part of a study as an intervention or control subject may be particularly motivated to change behavior. Navy women recruits did not voluntarily give up smoking; rather, smoking cessation during the eight weeks of training was mandatory. To our knowledge, virtually no civilian studies that include nonvolunteers exist to provide a comparison for the present results, with one exception. A program was developed by the American Lung Association (unpublished data cited in USDHHS, 1994)¹⁵ in which half of the participants were school-age smokers who were required to participate as a consequence of being caught smoking on school grounds. Nonvoluntary participation was thought partly to explain what the authors considered a low post-intervention cessation rate of 14%.

Smokers undergoing abrupt involuntary worksite smoking bans provide a somewhat appropriate comparison for participants in the present study, although worksite bans can only be enforced during working hours. Nonetheless, studies have shown that such restrictions can reduce the level of smoking among employees,³⁵⁻⁴² although positive effects on smoking cessation beyond what would occur naturally have not been consistently demonstrated.^{36,38,43}

Taken as a whole, comparisons among smokers in population studies, interventions, and work places with smoking restrictions suggest that the RTC smoking ban was modestly effective in helping smokers quit at a 3-month follow-up. The 11% follow-up cessation rate among baseline daily smokers is probably higher than expected had no ban been in place. Thus, restrictions on smoking during recruit training may provide smokers who desire to quit but have been unable to with an external impetus and support to quit. The recruit training smoking ban may have been most effective for casual smokers (i.e., experimenters), although appropriate comparison data are not available for these types of smokers. At least one study indicated that smoke-free work places are more likely to positively affect light and infrequent smokers than heavier smokers.⁴⁴

One other benefit of the smoking ban during training is the probable effect on prevention of smoking initiation. A study conducted prior to the ban showed that a substantial number of male recruits who were non-smokers at entry to the Navy began to smoke during recruit training.²¹ Because the present study did not follow-up baseline non-smokers, however, this positive preventive effect cannot be assumed.

Although it is encouraging that at least some recruits did not return to smoking after recruit training, most did relapse. Results from the present study suggest that while recruits *stop* smoking during training, most are not *quitting* smoking. Although few settings exist that provide a comparable situation to the 8-week total smoking ban at RTC, pregnancy-related smoking cessation may provide a somewhat similar experience. A large percentage of pregnant women stop smoking during pregnancy, only to relapse post-partum. An estimated 21 to 30% of smokers stop smoking at some point during their pregnancy,⁴⁵⁻⁴⁶ yet 63-73% are likely to resume smoking within six months of delivery.^{45,47-49} As is the case with pregnant women, recruits may have stopped smoking, but their high relapse rate suggests that they may not have fully prepared or committed themselves to quitting. Like pregnancy, recruit training may be a type of imposed or external motivator that does not require attitude change or the use of cognitive and behavioral coping strategies that typically help people in their smoking cessation efforts.⁵⁰ Once the external motivator is removed (i.e., birth of the baby; graduation from recruit training), relapse is a likely outcome. Indeed, some believe that exogenous interventions (e.g., environmental smoking bans; safer cigarettes) only provide transient effects without concomitant efforts to enhance people's desire to be healthy.⁵¹

Reasons for the high rate of return to smoking may be related to recruits' feelings of deprivation and loss of personal freedom during recruit training. Anecdotal reports from female Navy servicemembers recently graduated from recruit training confirm that many recruits look forward to "partying" once they leave recruit training and plan to indulge in behaviors prohibited during that time, although many expect to quit smoking

“later.” Another explanation may be that the first few months of Navy service after leaving RTC is stressful for some, who may smoke as a potential stress-reduction strategy.

Relapse rates varied significantly by age, the type of smoker one was at entry to recruit training, and intentions to smoke measured toward the end of training.

Women who were younger, were a more frequent type of smoker, and still intended to smoke at graduation were more likely to be smoking three months after leaving RTC.

Implementing motivational strategies directed at individuals during recruit training could help encourage more “hard core” smokers to change their self-image once leaving recruit training. Enforcement of the no-smoking policy within the context of the benefits to individual health and fitness versus restriction of freedom may encourage smokers to make positive changes in perceived smoking status and intentions. In addition, recruit division officers are in a unique position to influence young recruits positively through example. Recruit division officers also could motivate young recruits who look up to them by pointing out that much of the physical addiction is past, by reminding them of the many health-related benefits of their continued cessation, and by underscoring the value of being a non-smoker in today’s Navy and civilian workforce. In fact, a focus on enhanced employability appears to have provided a salient motivator for young women attending a civilian technical institute after high school.⁵² Another unexplored option is to provide pharmacological aid to smokers during recruit training who express an interest in quitting.

In summary, these results suggest that the impact of the 8-week involuntary ban on smoking was useful in providing some smokers an external impetus to quit. However, high relapse rates, particularly among younger smokers, more regular smokers, and those who at graduation still intend to smoke clearly show that most young female smokers entering the Navy need more than an organizationally-mandated smoking ban during recruit training to achieve abstinence from smoking. It is evident that those in greatest need of cessation (i.e., daily smokers) were the least likely to make positive changes in their perceptions of themselves as smokers and to stay quit after having abstained for eight weeks. These results cause one to question the effectiveness of a restrictive organizational policy alone in bringing about meaningful changes in smoking behavior. Others have questioned the application of environmental/organizational policies to address problem behaviors long-term without concurrent attitudinal or motivational change.⁵¹ Like most complex health behaviors, smoking cessation is probably more likely to succeed if diverse strategies that encompass both individual level (e.g., attitude change) and social/environmental strategies are used.

Acknowledgements

This research was supported by the Department of Defense (DoD) Defense Women's Health Research Program (DAMD17-95-5075).

The authors gratefully acknowledge the contribution of Suzanne L. Hurtado, MPH, Linda K. Hervig, MA, Shu-Hong Zhu, PhD, and John P. Elder, PhD, MPH.

REFERENCES

1. Bray RM, Marsden ME, Peterson MR. Standardized comparisons of the use of alcohol, drugs, and cigarettes among military personnel and civilians. *Am J Public Health*. 1991;81(7): 865-869.
2. Conway TL, Cronan TA. Smoking, exercise, and physical fitness. *Prev Med*. 1992;21(6): 723-734.
3. Conway TL, Cronan TA. Smoking and physical fitness among Navy shipboard personnel. *Mil Med*. 1988;153(11): 589-594.
4. Kroutil LA, Bray RM, Marsden ME. Cigarette smoking in the U.S. military: findings from the 1992 Worldwide Survey. *Prev Med*. 1994;23: 521-528.
5. Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*. U.S. Department of Health and Human Services (USDHHS), Public Health Service (PHS). Washington, DC: DHHS Publication No. (PHS) 91-50212; 1991.
6. Feigelman W. Cigarette smoking among former military service personnel: a neglected social issue. *Prev Med*. 1994;23: 235-241.
7. Klevens RM, Giovino GA, Peddicord JP, Nelson DE, Mowery P, Grummer-Strawn L. The association between veteran status and cigarette-smoking behaviors. *Am J of Prev Med*. 1995;11(4): 245-250.
8. Environmental Protection Agency (EPA). *Respiratory health effects of passive smoking: lung cancer and other disorders*. NIH Publication No. 93-3605. Washington, DC: Office of Health and Environmental Assessment; 1993.

9. California Environmental Protection Agency (Cal/EPA). *Health effects of exposure to environmental tobacco smoke: final report*. Sacramento, CA: Cal/EPA, Office of Environmental Health Hazard Assessment; September, 1997.
10. Pokorski TL, Chen W, Pigg RM, Dorman SM. Effect of educational intervention on smoking prevalence of U.S. Navy recruits. *Health Values*. 1995;19(5): 48-55.
11. Lamkin L, Houston TP. Nicotine dependency and adolescents: preventing and treating. *Adolesc Med*. 1998;25(1): 123-135.
12. McNeill AD, West RJ, Jarvis M, Jackson P, Bryant A. Cigarette withdrawal symptoms in adolescent smokers. *Psychopharmacology*. 1986;90: 553-536.
13. Ershler J, Levanthal H, Fleming R, Glynn K. The quitting experience for smokers in sixth through twelfth grade. *Addict Behav*. 1989;14: 365-378.
14. Hollis JF, Lichtenstein E, Mount K, Vogt TM, Stevens VJ. Nurse-assisted smoking counseling in medical settings: minimizing demands on physicians. *Prev Med*. 1991;20(4): 497-507.
15. U.S. Department of Health and Human Services (USDHHS). *Preventing Tobacco Use among Young People: A Report of the Surgeon General*. U.S. Department of Health and Human Services (USDHHS), Public Health Service (PHS), Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 1994.

16. Rigotti NA, Pashos CL. No-smoking laws in the United States: An analysis of state and city actions to limit smoking in public places and workplaces. *J Am Med Assoc.* 1991;266(22): 3162-3167.
17. Simonich WL. *Government Antismoking Policies*. New York, NY: Peter Lang; 1991.
18. Wasserman J, Manning WG, Newhouse JP, Winkler JD. The effects of excise taxes and regulations on cigarette smoking. *J Health Econ.* 1991;19(1): 43-64.
19. Secretary of the Navy, SECNAVINST 5100.13A. *Tobacco Prevention Program in the Navy and Marine Corps*, July 17, 1986.
20. Department of Defense (DoD), DoDINST 1010.15. *Smoke-free Workplace*, March 7, 1994.
21. Cronan TA, Conway TL, Kaszas SL. Starting to smoke in the Navy: when, where and why? *Soc Sci Med.* 1991;33(12): 1349-1353.
22. Woodruff SI, Edwards CC, Conway TL. Enhancing response rates to a smoking survey for enlisted US Navy women. *Eval Rev.* 1998;22(6): 780-791.
23. Kantor J, Ford M, Heron JE. *Navy-wide Personnel Survey (NPS) 1995: Statistical tables for enlisted personnel* (Technical note no. 96-43). San Diego, CA: Navy Personnel Research and Development Center; February, 1997.
24. Kantor J, Ford M, Olmstead M. *Navy-wide Personnel Survey (NPS) 1996: Statistical tables for officers and enlisted personnel* (Technical note no. 97-5/6). San Diego, CA: Navy Personnel Research and Development Center; February, 1997.

25. Fagerstrom DO, Schneider NG. Measuring nicotine dependence: a review of the Fagerstrom Tolerance Questionnaire. *J Behav Med.* 1989;12: 159-181.
26. Rojas NL, Killen JD, Haydel KF, Robinson TN. Nicotine dependence among adolescent smokers. *Arch Pediatr Adolesc Med.* 1998;152: 151-156.
27. Cronan TA, Conway TL, Hervig LK. Evaluation of smoking interventions in recruit training. *Mil Med.* 1989;154(7): 371-375.
28. Pachacek T. as cited in Flay RP. Mass media and smoking cessation: a critical review. *Am J Public Health.* 1984;77(2): 153-160.
29. Hurtado SL, Conway TL. Changes in smoking prevalence following a strict no-smoking policy in U.S. Navy recruit training. *Mil Med.* 1996;161(10): 571-576.
30. Burns D, Pierce J. *Tobacco use in California 1990-1991*. Sacramento: California Department of Health Services; 1992.
31. Zhu S-H, Sun J, Billings S, Choi WS. Predictors of smoking cessation in U.S. adolescents. *Am J of Prev Med.* In press.
32. Moss AJ, Allen KF, Giovino GA, Mills SL. Recent trends in adolescent smoking, smoking-uptake correlates, and expectations about the future. *Advance Data*. US Department of Health and Human Services (USDHHS), Public Health Service (PHS), Centers for Disease Control and Prevention, National Center for Health Statistics, No. 221; 1992.
33. Sussman S, Lichtman K, Ritt A, Pallonen U. Effects of thirty-four adolescent tobacco use cessation and prevention trials on regular users of tobacco products. *Substance Use and Misuse*. In press.

34. Stanton WR, McClelland M, Elwood C, Ferry D, Silva PA. Prevalence, reliability and bias of adolescents' reporting of smoking and quitting. *Addiction*. 1996;91(11): 1705-1714.
35. Becker DM, Conner HF, Waranch HR, Stillman F, Pennington L, Lees PS, Oski F. The impact of a total ban on smoking in the Johns Hopkins Children's Center. *J Am Med Assoc*. 1989;262 (6): 799-802.
36. Biener L, Abrams DB, Follick MJ, Dean L. A comparative evaluation of a restrictive smoking policy in a general hospital. *Am J Public Health*. 1989;79(2): 192-195.
37. Borland R, Chapman S, Owen N, Hill D. Effects of workplace smoking bans on cigarette consumption. *Am J Public Health*. 1990;80(2): 178-180.
38. Borland R, Owen N, Hocking B. Changes in smoking behavior after a total workplace smoking ban. *Aust J Public Health*. 1991;15(2): 130-134.
39. Gottlieb NH, Eriksen MP, Lovato CY, Weinstein RP, Green LW. Impact of a restrictive work site smoking policy on smoking behavior, attitudes, and norms. *J Occup Med*. 1990;32(1): 16-23.
40. Millar WJ. Evaluation of the impact of smoking restrictions in a government work setting. *Can J Public Health*. 1988;79: 379-382.
41. Petersen LR, Helgersen SD, Gibbons CM, Calhoun CR, Ciacco KH, Pitchford KC. Employee smoking behavior changes and attitudes following a restrictive policy on worksite smoking in a large company. *Public Health Rep*. 1988;103(2): 115-120.

42. Rosenstock IM, Stergachis A, Heaney C. Evaluation of smoking prohibition policy in a health maintenance organization. *Am J Public Health*. 1986;76(8): 1014-1015.
43. Sorensen G, Rigotti N, Rosen A, Pinney J, Prible R. Effects of a worksite no-smoking policy: evidence for increased cessation. *Am J Public Health*. 1991;81(2): 202-204.
44. Pierce JP, Evans N, Farkas AJ, Cavin SW, Berry C, Kramer M, Kealey S, Rosbrook B, Choi W, Kaplan RM. *Tobacco use in California. An evaluation of the tobacco control program, 1989-1993*. La Jolla, CA: University of California, San Diego; 1994.
45. Floyd RL, Rimer BK, Giovino GA, Mullen PD, Sullivan SE. A review of smoking in pregnancy: effects on pregnancy outcomes and cessation efforts. *Annu Rev Public Health*. 1993;14: 379-411.
46. Ershoff DH, Quinn VP, Mullen P D. Relapse prevention among women who stop smoking early in pregnancy: a randomized clinical trial of a self-help intervention. *Am J Prev Med*. 1995;11(3): 178-184.
47. Fingerhut LA, Kleinman JC, Kendrick JS. Smoking before, during, and after pregnancy. *Am J Public Health*. 1990;80: 541-544.
48. McBride CM, Pirie PL, Curry SJ. Postpartum relapse to smoking: a prospective study. *Health Educ Res*. 1992;7: 381-390.
49. Mullen PD, Quinn VP, Ershoff DH. Maintenance of nonsmoking postpartum by women who stopped smoking during pregnancy. *Am J Public Health*. 1990;80: 992-994.

50. Stotts AL, DiClemente CC, Carbonari JP, Mullen PD. Pregnancy smoking cessation: a case of mistaken identity. *Addict Behav.* 1996;21(4): 459-471.
51. Wilde GJS. Beyond the concept of risk homeostasis: suggestions for research and application towards the prevention of accidents and lifestyle-related disease. *Accid Anal Prev.* 1986;18(5): 377-401.
52. Moore SM, Daly K, McBride CM, Lodahl MS. Smoking doesn't work: a smoking prevention project for women attending a technical institute. *J Sch Health.* 1992;62(2): 55-58.

Table 1
Sociodemographic Characteristics of Navy Women Recruits (1996-1997)

Sociodemographic Characteristic	Navy Recruit Sample	
	%	<u>n</u>
Age		
17-18 years	40.9	2253
19-23	50.2	2761
24-35	8.9	465
Education		
Less than high school	5.5	302
High school	85.1	4666
More than high school	9.4	513
Race/ethnicity		
White, non-Hispanic	57.9	3169
Black	23.3	1273
Hispanic	12.2	670
Asian/Pacific Islander	4.2	228
Native American	2.4	130

Note. ns within a sociodemographic characteristic do not total 5503 because of small amounts of missing data.

Table 2

Independent Correlates of Perceptions of Being A Smoker at Graduation among Navy
Recruit Women "Smokers"^a

Correlate Measured at Entry	Adjusted Odds Ratio	p
Race/ethnicity		
White non-Hispanic ^b	1.00	--
Black	.54	.005
Hispanic	1.01	.975
Asian/Pacific Islander	.60	.120
Native American	1.31	.509
Type of Entry Smoker		
Experimenter ^b	1.00	--
Occasional	2.96	.002
Daily	7.60	.000
Former	4.45	.002
Cigarettes smoked per day during the past 30 days (mean category) ^c	1.25	.000
Intentions to smoke (mean) ^d	2.57	.000

^a Included ever smokers at entry.

^b reference group

^c Scale includes 1 (less than 1 cigarette on average), 2 (1-5 cigarettes), 3 (6-10 cigarettes, 4 (11-15 cigarettes, 5 (16-20 cigarettes, 6 (21-25 cigarettes, 7 (26-30 cigarettes, 8 (31-25 cigarettes, 9 (36-40 cigarettes, and 10 (more than 40 cigarettes).

^d Scale includes 1 (definitely no), 2 (probably no), 3 (probably yes), and 4 (definitely yes)

Note. n=1718

Table 3

Independent Correlates of Smoking Relapse among Navy Recruit Women "Smokers"^a

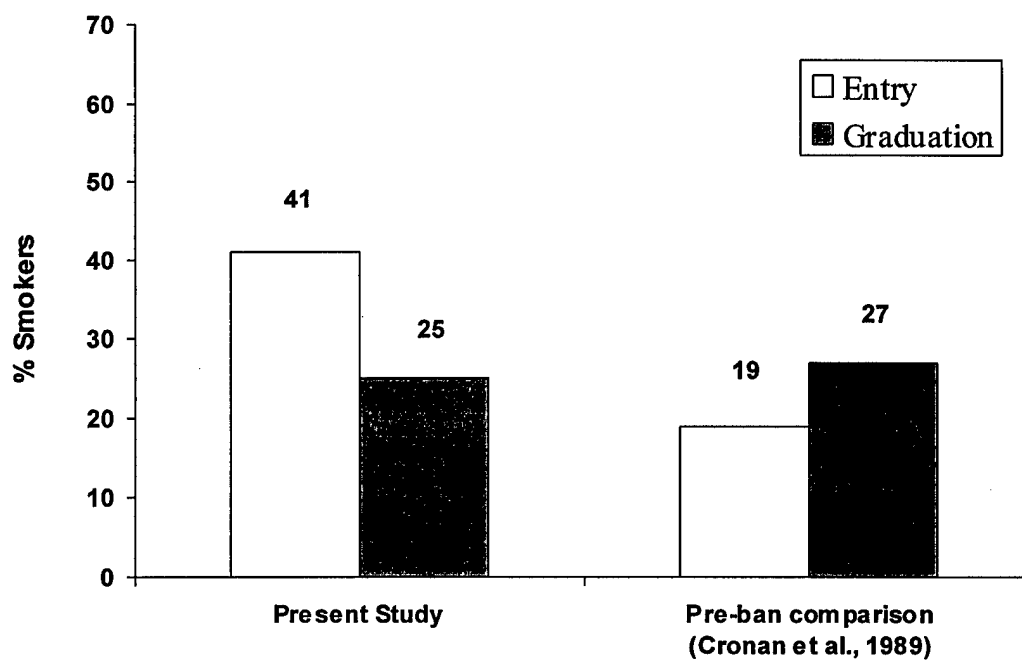
Correlate	Adjusted Odds Ratio	p
Age		
17-18	2.18	.072
19-23	2.96	.012
24-35 ^b	1.00	--
Type of Entry Smoker		
Experimenter ^b	1.00	--
Occasional	2.58	.009
Daily	5.31	.000
Former	1.40	.553
Intentions to smoke measured at graduation (mean) ^c	1.45	.003

^a Included ever smokers at entry.^b reference group^c Scale includes 1 (definitely no), 2 (probably no), 3 (probably yes), and 4 (definitely yes)

Note. n=630

Figure 1

Entry-to-Graduation Changes in Perceived Smoking Status among Navy Recruits



Perceived Smoking Status at Graduation among Navy Women

Recruit Entry Smokers

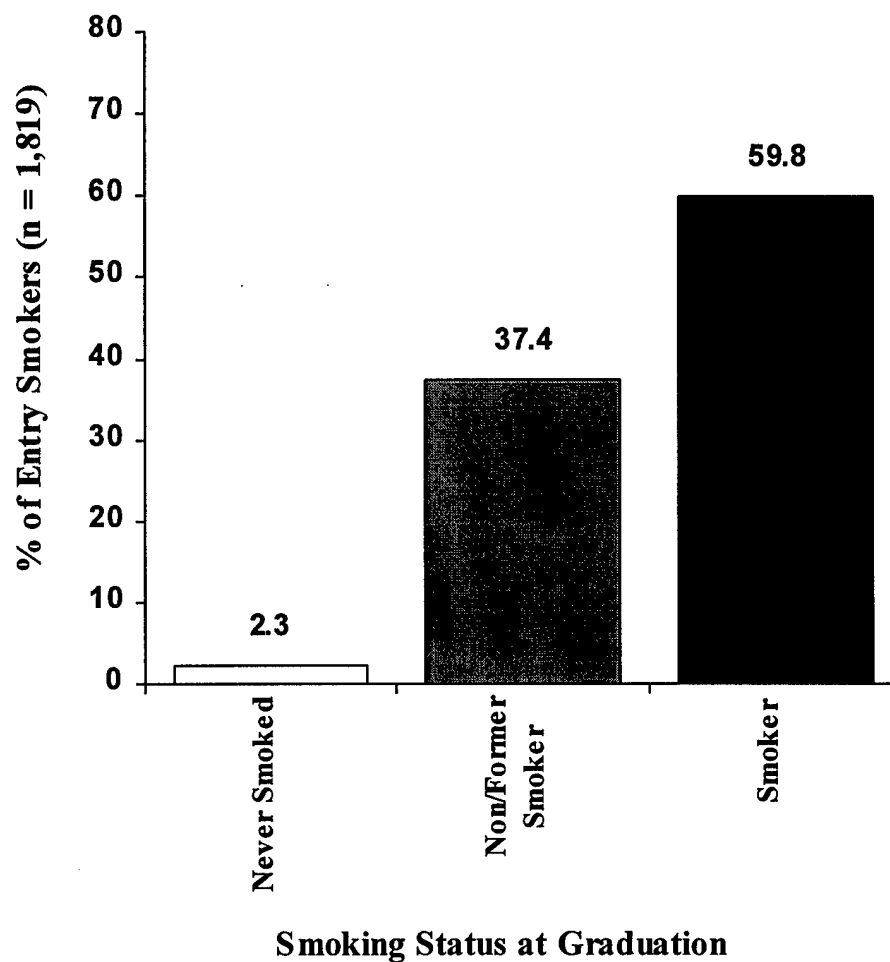
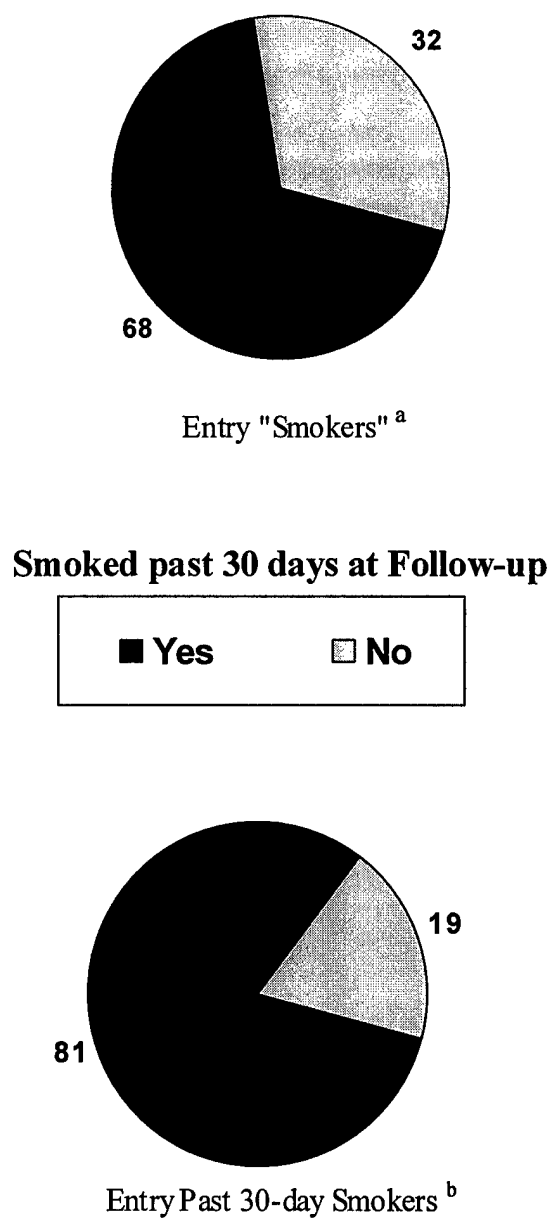


Figure 3

Prevalence of Smoking among Navy Women Recruits at the 3-month Follow-up

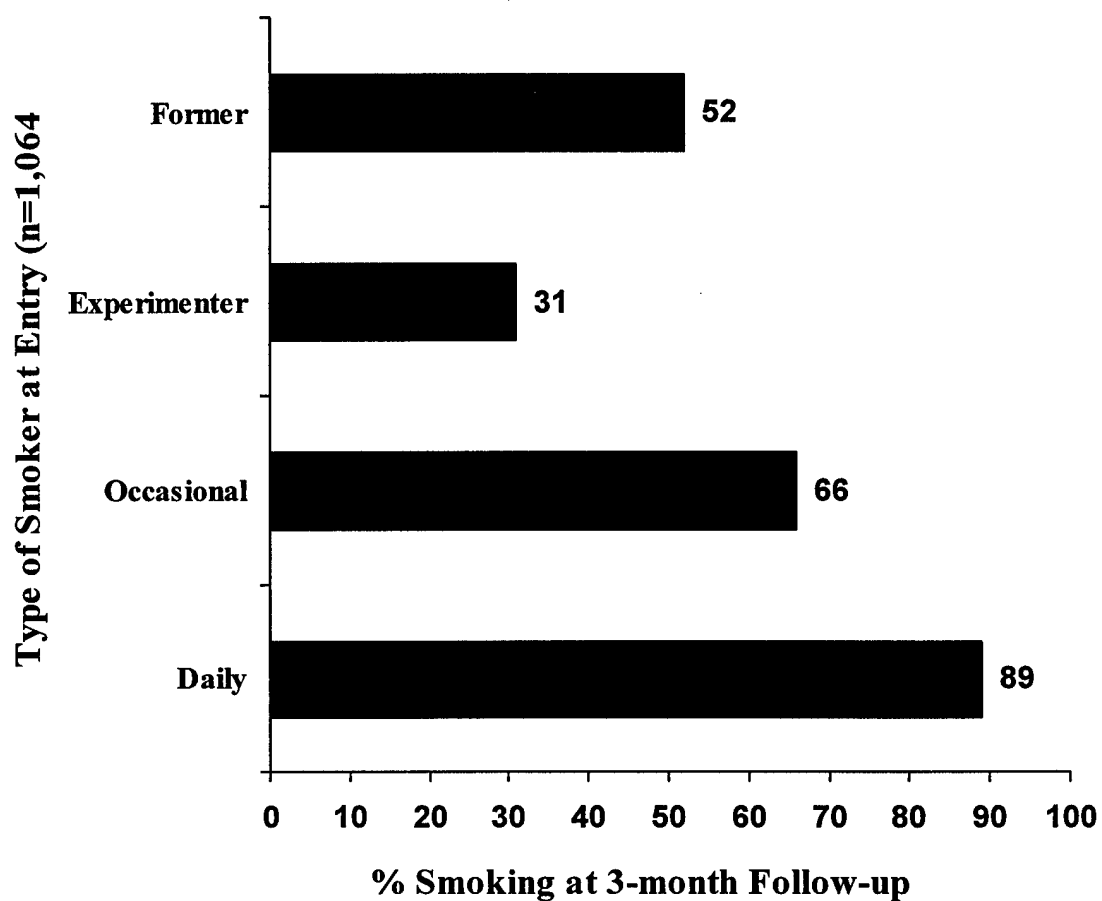


^a Includes all recruits with any smoking experience prior to entry (n=1,064).

^b Includes only past 30-day smokers at entry (n=780).

Figure 4

Prevalence of Smoking among Navy Women Recruits at the
3-month Follow-up by Type of Entry Smoker



Increasing Response Rates to a Smoking Survey for U.S. Navy Enlisted Women

Susan I. Woodruff, PhD, Terry L. Conway, PhD, and Christine C. Edwards, MPH

Graduate School of Public Health, San Diego State University, 9245 Sky Park Court,
Suite 120, San Diego, CA 92123

Correspondence author: Susan I. Woodruff, Graduate School of Public Health, San
Diego State University, 9245 Sky Park Court, Suite 120, San Diego, CA 92123 Voice:
(619) 594-2787, FAX: (619) 594-3143, email: swoodruf@mail.sdsu.edu

Short title: Increasing Response to a Smoking Survey

Under Review

Acknowledgements

This research was supported by a grant from the Department of Defense, U.S. Army Medical Research and Materiel Command, Defense Women's Health Research Program (no. DAMD17-95-1-5075).

Abstract

Increasing Response Rates to a Smoking Survey for U.S. Navy Enlisted Women

Mailed health surveys, frequently used to collect epidemiological data and evaluate the effects of interventions, are convenient and tend to be less expensive to conduct than either telephone or in-person surveys. However, low response rates and response bias can limit the generalizability and threaten the validity of survey results. This study examined the effectiveness of several persistent strategies to increase the response to a smoking survey among newly enlisted U.S. Navy women, a population that is young, ethnically-diverse, relatively unskilled, mobile, and in some respects considered "high-risk" in terms of health behaviors. The stepped approach, which included the use of incentives, repeated mailings, alternative survey administration modes, and reminders was evaluated in terms of effects on response rates and response bias. Demographic and baseline smoking-related characteristics were compared for those responding on-time to the initial mailed follow-up survey, "reluctant" respondents who did not respond initially but eventually completed a survey after further prompting, and nonrespondents.

Results showed that incentives and persistent efforts were effective in substantially increasing the response among 2,231 eligible participants, more than doubling the response rate (from 24.9% to 52.5%). The characteristics of on-time, reluctant, and non-respondents did not differ significantly in terms of sociodemographic characteristics. On the other hand, on-time respondents were different from both reluctant respondents and nonrespondents in terms of smoking-related behaviors. These results are encouraging because it appears that the persistent efforts resulted in collecting

data from higher risk individuals (i.e., more “hard core” smokers) who would not have otherwise been represented. Thus, to the extent possible, incentives, alternative administration strategies, and repeated attempts should be used to collect survey data from hard-to-reach populations. Such efforts will likely increase response rates, and even more important, may reduce response bias by collecting data from more individuals in higher health risk categories.

Increasing Response Rates to a Smoking Survey for U.S. Navy Enlisted Women

With dramatic changes in the military environment (e.g., downsizing), mailed surveys are playing an increasing role in monitoring personnel issues, attitudes, job-related factors, quality of life, and health behavior. However, a primary problem with using mailed surveys is the typically low response rate of participants and differential response among particular groups of people (Fox, Crask, & Kim, 1988; Tambor, Chase, Faden, Geller, Hofman & Holtzman, 1993). Nonresponse presents potential biases that can limit the generalizability and threaten the validity of survey results (Kristal, White, Davis, Corycell, Raghunathan, Kinne, & Lin, 1993). Nonresponse to *health* surveys is typically associated with lower socioeconomic status, young age, male sex, minority status, and health-risk behaviors (e.g., smoking) (Armstrong, White & Saracci, 1992). If results of mailed surveys are to be reliable and useful, it is critical to implement strategies that will generate the highest response rates possible and capture a representative sample of respondents. Unfortunately, mailed surveys, in both civilian and military samples, are prone to low response rates and response bias in terms of socioeconomic status and risk behavior. Within the military, response rates to surveys are typically lower among newly enlisted personnel [Personal Communication, Naval Health Research Center, 1997], a population that is young, ethnically-diverse, relatively unskilled, mobile, and in some respects considered "high-risk" in terms of health behaviors (Bray, Kroutil, Wheelless, Marsden, Bailey, Fairbank, Harford, 1995).

A previous article reported on the effectiveness of a stepped approach to increasing response rates of newly enlisted Navy women smokers to a self-report

smoking survey mailed only 3 months after leaving recruit training (Woodruff, Edwards, & Conway, 1998). Results showed that the approach was effective in more than doubling the survey response rate. Late respondents did not differ from on-time respondents in terms of demographics or smoking behavior, although *nonrespondents* were less educated and heavier smokers than both on-time and late respondents.

The present study builds on this previous work by reporting on the results of additional, persistent strategies to increase the response to a longer-term follow-up survey among the same cohort. The effect of the approach on response rates as well as characteristics of respondents and nonrespondents were evaluated. Demographic and smoking-related characteristics were compared for those responding on-time to the initial mailed follow-up survey, "reluctant" respondents who did not respond initially but eventually completed a survey after further prompting, and nonrespondents.

Methods

Participants and Procedures

Study participants consisted of volunteers from among all female recruits entering the US Navy between March 1996 and March 1997 (12 consecutive months). These recruits were volunteers for a large-scale intervention study of smoking cessation/relapse prevention strategies for Navy women during their first year of service (see Conway, Woodruff, Edwards, Elder, Zhu, Hervig, & Hurtado, 1996 for a description of the overall intervention study). Recruits indicating on a baseline survey at entry to recruit training that they were "ever smokers" (i.e., experimenters, occasional, daily, or former smokers) comprised the cohort ($n=3,036$) that was targeted for

surveying one year after leaving recruit training. Approximately 73% of the cohort of baseline smokers were still in the Navy at the 1-year follow-up, resulting in a final number of 2,231 eligible participants. The study used the Navy standard personnel Enlisted Master Record (EMR) to track the cohort for the purpose of administering the machine-scannable smoking survey, and for providing sociodemographic characteristics.

The cohort of 2,231 women was young, with 92% being less than 24 years of age. The mean age was 19 years ($SD=2.65$). The majority (86%) had exactly a high school education, and 8% had more than a high school education. In terms of ethnic background, 70% were White/non-Hispanic, 12% were Black, 13% were Hispanic, 4% were Asian/Pacific Islander, and 2% were Native American.

Strategies to Increase Response Rates

A number of strategies were used to maximize response to the 12-month survey that included incentives, reminders, and different survey administration procedures. The initial survey was mailed directly to participants at their current commands and enclosed a postage-paid return envelope. Two incentives were offered for returning the completed initial survey: a phonecard good for 10 minutes of free long distance calls, and a chance at winning a \$100 lottery prize. One week after mailing the survey, a postcard was automatically sent that reminded participants to return their survey and restated the chance to win a \$100 lottery prize. Two weeks after sending the initial mailed survey, trained telephone surveyors attempted to contact nonrespondents at their commands (if in the continental U.S.) to conduct the survey over the phone and offered participants a phonecard for completing the survey. Phone surveyors continued their attempts to complete the phone survey for two weeks. If after two weeks of attempting to conduct

the survey by phone the participant had not been reached, the survey was re-mailed with the promise of \$20 if completed and returned. Two weeks later, (about six weeks after the initial mailed survey had been sent), an abbreviated "postcard" version of the survey with a few critical items was mailed to those who had not yet returned a survey. Once again, a chance at winning \$100 was offered for completing the "postcard" survey. The final effort was a "plea card" that asked nonrespondents to call collect one of the telephone surveyors to conduct the survey over the phone and earn \$20.

Measures

As a result of these varied efforts, 12-month survey data could have been collected by five different means: (1) initial mailed survey, (2) telephone survey, (3) repeated mailing of a full survey, (4) brief postcard survey, and (5) telephone survey in response to the "plea card." Therefore, study participants were categorized into one of six response groups: (1) those responding on-time to the initial mailed follow-up survey, (2) those completing the telephone survey, (3) those completing the repeated survey, (4) those completing the brief postcard survey, (5) those completing a "plea card" telephone survey, and (6) nonrespondents. Those responding to the telephone survey, repeated survey, brief postcard survey, or "plea card" survey were considered "reluctant" respondents.

Response groups were compared on a variety of demographic and smoking variables measured at entry into basic training (i.e., baseline). Demographic characteristics included *age*, *race/ethnicity*, and *education*. Baseline smoking variables included *type of smoker* (experimenter, occasional, daily, or former). A measure of baseline nicotine dependence was self-reports of the *number of cigarettes smoked on a*

typical day during the 30 days prior to entering recruit training, measured on a scale ranging from 0 (0 cigarettes) to 10 (more than 40 cigarettes). *Intentions to smoke* after leaving basic training was measured on a scale ranging from 1 (definitely no) to 4 (definitely yes).

Results

Those recruits reporting any experience with smoking at entry to recruit training and who were still in the Navy according to the EMR were sent a 12-month follow-up survey. Approximately 53% ($n=1,177$) of those eligible for follow-up ($n=2,231$) (i.e., still in the Navy according to Navy personnel files) completed the survey by one of the five administration modes. Table 1 presents the response rates associated with each strategy taken to collect survey data. Almost 25% returned the initial mailed survey, a higher response rate than that (11%-17%) typically reported for one-time surveys sent to lower-ranking Navy enlisted personnel (Kantor, Ford, & Heron, 1996; Kantor, Ford, & Olmstead, 1997). Other administration strategies and versions of the survey were useful in collecting data from an additional 27.8% of participants. The telephone survey and the repeated mailing of the survey were particularly useful, collecting data from 13% and 11% of participants, respectively. Telephone surveys conducted in response to the "plea card" were few—only 11 participants called surveyors collect.

Insert Table 1 about here

For analysis assessing the characteristics of individuals who responded to different survey administration strategies, respondents to the phone survey, repeated

survey, postcard survey, and plea card phone survey were combined to comprise a "reluctant" respondent group. Combining these groups was justified because (a) initial analyses showed no significant differences in these groups in terms of sociodemographic or baseline smoking variables, and (b) the number of respondents in the postcard survey group (n=87) and particularly the plea card phone survey group (n=11) were too small to consider the groups separately.

Table 2 presents response group comparisons on demographic and baseline smoking variables using chi-square analysis and one-way ANOVAs. Analyses showed that the three groups did not differ significantly with regard to age, race/ethnicity, or education. Significant group differences were found for all three of the baseline smoking variables. In general, respondents to the initial mailed survey were less frequent smokers, were lighter smokers, and had lower intentions to smoke in the future than reluctant respondents and nonrespondents. Reluctant respondents and nonrespondents showed considerable similarity in their baseline smoking.

Insert Table 2 about here

Conclusions

Results showed that incentives and persistent efforts were effective in substantially increasing response rates to a smoking survey among young Navy enlisted women. Just the use of the two relatively inexpensive monetary incentives offered with the initial survey (i.e., a chance at winning a \$100 lottery prize, and a phonecard good for 10 minutes of free long distance calls) resulted in a higher response rate (24.9%) than

that typically seen (11-17%) in other Navy personnel surveys (Kantor, Ford, & Heron, 1996; Kantor, Ford, & Olmstead, 1997).

Incentives, and supplemental survey administration strategies, including the telephone and repeated mailings resulted in collecting data from an additional 27.8%--more than doubling the response rate. The use of the telephone appeared particularly useful, although it is obviously a less feasible option for personnel who are shipboard and overseas.

Analysis showed that the characteristics of on-time, reluctant, and non-respondents did not differ significantly in terms of sociodemographic characteristics. On the other hand, on-time respondents were different than reluctant respondents and nonrespondents in terms of their smoking-related behaviors. These results are encouraging because it appears that the additional efforts resulted in collecting data from higher risk individuals (i.e., more "hard core" smokers) who would not have otherwise been represented. These findings are partially in contradiction with those of our previous study that found no great differences between on-time and reluctant respondents (Woodruff, Edwards, & Conway, 1998). The response enhancement efforts in the previous study were not as intense as those in the present study, and may not have been enough to persuade the more hard core smokers to respond.

The present study has several practical limitations. The *separate* effects of incentives, reminders, and repeated survey mailings cannot be determined. For example, we do not know to what extent the monetary incentives, phone card incentive, or simply repeating survey attempts accounted for the greatest payoff. One other limitation relates to constraints on military researchers to use monetary incentives, although other salient

incentives can probably be identified. Finally, the costs associated with an approach as aggressive as this one may be prohibitively high for some survey efforts. Investigators will have to weigh the cost of any effort against the potential benefit. The present study describes several strategies taken to increase response rates, any one of which may be considered potentially effective in light of its cost.

These results will be useful for those conducting surveys to describe and evaluate Navy programs. With reduced personnel and a changing Navy environment, there are concerns about decrements in readiness and morale. Mailed surveys are playing an increasing role in monitoring personnel issues, attitudes, health, job-related factors, and quality of life. To the extent possible, incentives and repeated attempts should be used to collect survey data. Such efforts will likely increase response rates, and even more important, may reduce response bias by collecting data from more individuals in higher health risk categories.

References

- Armstrong B.K., White E., and Saracci R. (1992) *Principles of Exposure Measurement in Epidemiology*. Oxford University Press, London.
- Bray R.M., Kroutil L.A., Wheelless S.C., Marsden M.E., Bailey S.L., Fairbank J.A., and Harford T.C. (1995) *1995 Department of Defense Survey of Health Related Behaviors among Military Personnel*. Research Triangle Park, NC: Research Triangle Institute.
- Conway T.L., Woodruff S.I., Edwards C.C., Elder J.P., Zhu S.-H., Hervig L.K., and Hurtado S.L. (1996) Operation Stay Quit: smoking relapse prevention for Navy women recruits. *The Health Psychologist* 18(2):4-5.
- Fox R.J., Crask M.R., and Kim J. (1988) Mail survey response rate: a meta-analysis of selected techniques for inducing response. *Public Opinion Quarterly* 52: 467-491.
- Kantor J., Ford M., and Heron J.E. (April, 1996) *Navy-wide Personnel Survey (NPS) 1995: Statistical Tables for Enlisted Personnel*. San Diego, CA: Navy Personnel Research and Development Center, TN-96-43.
- Kantor J., Ford M., and Olmstead M. (February, 1997) *Navy-wide Personnel Survey (NPS) 1996: Statistical Tables for Officers and Enlisted Personnel*. San Diego, CA: Navy Personnel Research and Development Center, TN-97-5/6.
- Kristal A.R., White E., Davis J.R., Corycell G., Raghunathan T., Kinne S., and Lin T.K. (1993) Effects of enhanced calling efforts on response rates, estimates of health behavior, and costs in a telephone health survey using random-digit dialing. *Public Health Reports* 108(3): 372-379.
- Tambor E.D., Chase G.A., Faden R.R., Geller G., Hofman K.J., and Holtzman N.A. (1993) Improving response rates through incentive and follow-up: the effect on a survey of physicians' knowledge of genetics. *American Journal of Public Health* 83:1599-1603.
- Woodruff S.I., Edwards C.C., and Conway T.L. (1998) Enhancing response rates to a smoking survey for enlisted US Navy women. *Evaluation Review* 22(6): 780-791.

Table 1

Changes Associated with Steps to Increase Survey Response Rate

Survey Administration	Number completing survey	Response rate (% of eligible 2,231)
Initial Mailed Survey	556	24.9
Telephone Survey	284	12.7
Repeated Survey	239	10.7
Postcard Survey	87	3.9
Plea card Phone Survey	11	0.5
Total	1,177	52.7

Table 2

Comparison of Respondents, Reluctant Respondents, and Nonrespondents on Sociodemographic and Baseline

Smoking Characteristics

Baseline Characteristic	% or Mean			χ^2 or F
	Respondents to Initial Mailed Survey	Reluctant Respondents ^a	Nonrespondents	
Age (mean)	19.8	19.8	19.6	1.2
Race/ethnicity (%)				
White, non-Hispanic	66.4	70.4	71.5	
Black	12.6	10.0	11.9	
Hispanic	12.9	13.6	11.8	
Asian/Pacific Islander	5.0	3.9	3.3	
Native American	3.1	2.1	1.5	11.2
Education (%)				
< high school	4.9	5.3	6.2	
High School	84.4	86.5	86.5	
> high school	10.8	8.2	7.3	6.8
Type of smoker (%)				
Experimenter	29.0	19.3	21.4	
Occasional	23.4	23.3	20.7	
Daily	41.7	51.4	52.0	
Former	5.9	6.0	5.9	23.8*
Cigarettes smoked per day in past 30 days (mean category) ^b				
	2.3	2.7	2.8	7.2*
Intentions to smoke (mean) ^c	1.9	2.1	2.1	7.7*
n	556	621	1,054	

* $p \leq .001$ ^a Includes respondents to phone survey, repeated mailed survey, postcard survey, and "plea" card phone survey, as preliminary analysis showed no significant differences among these groups.^b Response scale ranged from 0 (none) to 10 (more than 40).^c Response scale ranged from 1 (definitely no) to 4 (definitely yes).

Abstract Submission Form
126th Annual Meeting
Theme: "Public Health and Managed Care"
Washington, DC—November 15–19, 1998

DEADLINE: Received on or before February 10, 1998

FOR PROGRAM PLANNER USE

Session: _____

Day: _____

Time: From _____ To _____

Abstract:

☐ Contributed

☐ Solicited

Operation Stay Quit: A Mail Intervention to Prevent Smoking Relapse Among Navy Women Recruits

Christine C. Edwards, M.P.H., Susan L. Woodruff, Ph.D.(cand.), Terry L. Conway, Ph.D.

Studies indicate that U.S. Navy women are more likely to smoke than their civilian counterparts, with smoking rates reported as high as 35-50%. For all new recruits, smoking is strictly prohibited 24 hours a day for the eight-week period of recruit training. While it is tempting to believe that these women recruits have successfully passed a critical period for smoking cessation, as many as 67% of recruits immediately return to smoking upon graduating from recruit training. Operation Stay Quit designed a mailed materials intervention for these women to provide motivational and behavioral cues at critical relapse points following recruit training. The intervention was conducted over a 12-month period, with more frequent contact during the first 4 months when relapse was most likely to occur. Participants' smoking status at 6 months post-RTC graduation was assessed through a self-report, written survey. Preliminary results of the 6-month follow-up survey indicate that women in the mailed materials condition were more likely to have quit, made more quit attempts, and reported less nicotine dependence than those in the control condition, although differences were not statistically significant. A 12-month follow-up survey is planned.

DISCLOSURE:

Educational Objectives (type single-space, 50 words or less): At the conclusion of the presentation, the participant should be able to (e.g., demonstrate, recognize, analyze, identify)....

To identify effective strategies for preventing smoking relapse among young women.

Continuing Professional Education

I would like the session during which this abstract will be presented to be eligible for CPE contact hours:

☐ Yes ☒ No

If Yes, in which discipline(s):

☐ Physicians

☐ Registered Nurses

☐ Certified Health Education Specialists

☐ Registered Dietitians

☐ Dentists/Dental Professionals

☐ Chiropractors

☐ Laboratory Professionals

Preferred format for presentation:

☐ Verbal presentation

☒ Poster

☐ Roundtable

☐ No preference

Abstract submitted to the following ONE

Section/SPIG/Caucus

ATOD

Key Words (2): smoking relapse

Checklist for Abstract Submission Material (Have you completed and included the following in your packet?)

- 9 copies of the Abstract Submission Form (5 copies with authors' names included, and 4 copies without authors' names or any reference to their organization/institution in the title or body of the abstract)
 - Does your Abstract Submission Form include:
 - Educational Objectives
 - Continuing Professional Education Designation
 - Key Words
- Presenter Identification Form
- Financial Disclosure Statement (one for each presenter)
- Self-addressed, stamped postcard
- Self-addressed, stamped envelope
- Additional requirements specified by Section/SPIG/Caucus

Mail Abstract Submission directly to ONE Section/SPIG/Caucus as per instructions.

Smoking in U.S. Navy Women Recruits: Sociodemographic Correlates and Comparisons with Civilian Women. KB Weaver. Graduate School of Public Health, San Diego State University.

Although the prevalence of smoking has declined among both military and civilian populations since the 1980s, smoking rates continue to be higher among military personnel. The higher rate of smoking among military personnel raises concerns because of the unique physical demands of military life on which smoking has adverse affects. Smoking-related concerns may be even more pertinent for military women since there is evidence that they are especially likely to smoke and smoke heavily. The military is much different in sociodemographic composition than the general U.S. population, and such differences must be accounted for in any comparisons between the military and civilian populations. The primary aims of the present study are as follows: 1) investigate the sociodemographic factors related to smoking among women entering the U.S. Navy; and 2) compare the smoking rates between Navy women recruits and their civilian counterparts, after standardizing the civilian population to the distribution of race/ethnicity, age, and education in the Navy population. This is a methodology that has been used by previous researchers in making comparisons between military and civilian populations. Navy women recruits (n=4,259) ranged in age from 17-35 years with a mean age of 20 years. The majority of the recruits were white (58%), although Blacks comprised 23% and Hispanics comprised 13% of the recruit population. Most of the recruits had a high school education or less (91%). Among the Navy women recruits, age, education, and race/ethnicity were independent predictors of current and heavy smoking. Comparisons with civilian women showed that Navy women recruits aged 18-23 had significantly higher rates of current and heavy smoking, after standardization. No significant differences were found for women aged 24-30. It appears that the Navy is attracting young female smokers, many of whom smoke heavily. These findings have important implications for Navy health promotion policy and programs.

San Diego Biostatistics and Epidemiology Research Exchange, 1997

ABSTRACT FORM

Indicate below the name, address, and telephone number of author who should receive correspondence:

Name: Katie Weaver

Affiliation: Graduate School of Public Health, San Diego State University

Address: 9245 Sky Park Ct. Ste 120, San Diego, CA 92123

Telephone: 594-1978

FAX: 594-3143

E-Mail: kball@mail.sdsu.edu

Please check if student

☒



Draft

(Author making presentation)

Name and title Susan I. Woodruff, M.A.

Address 9245 Sky Park Ct., Ste. 120

City San Diego State CA Zip 92123

Telephone (619) 594-2787

Presenter's FAX (619) 594-3143

Presenter's E-mail swoodruf@mail.sdsu.edu

Call for Abstracts

APHA 124th Annual Meeting
New York, NY - Nov17-Nov21, 1996

Persons wishing to contribute presentations or papers to be considered for the APHA Annual Meeting must submit an abstract of the work on the form provided below. The abstract form must be accompanied by an Author/Co-Author ID Form. The 2 forms should be mailed to the designated Section, SPIG, or Caucus Representative and RECEIVED no later than February 09, 1996. Do not submit the same abstract to more than one Section or APHA component

TO BE COMPLETED BY PROGRAM CHAIRPERSON

SESSION:

Day _____

Date _____

Time: From _____ To _____

ABSTRACT: ☐ Contributed
☐ Solicited

We are unable to print the entire Call for Abstracts in this publication due to its growing length. However, we will send all members the complete Call for Abstracts for the Sections, SPIGs, and Caucuses. Please look for the mailing and follow the instructions for the specific section to which you plan to submit your abstract. We shall also have the information on our Fax-on-Demand starting on December 4, 1995; call (202) 274-4577

TYPE ABSTRACT TITLE IN UPPER LETTERS. Type authors' and co-authors' names using upper and lower case letters and underline, with presenter's name listed first, who will be the only one to receive the detailed program participant mailing. Type abstract text flush left, single-spaced, within parameters of the box, using standard size type. Abstracts should be of camera-ready quality, suitable for 50% reduction.

Section, SPIG, Caucus or APHA Group Abstract submitted to: Alcohol, Tobacco & Other Drugs

I have submitted this abstract to only ONE section/component of APHA

(sign)

If your abstract is selected for presentation, do you prefer to present it as a: ☒ poster; ☐ verbal presentation; ☐ roundtable; ☐ any of these

What Audio Visual equipment will you need for your presentation: ☐ Slide projector or ☐ Overhead projector ☐ Other

Are self-addressed stamped envelope and postcard enclosed?: ☒ Yes ☐ No

Are the appropriate number of original abstracts, blind review copies and author ID forms enclosed (see section requirements)? ☒ Yes ☐ No

Effect of an Eight-week Involuntary Smoking Ban on Women's Perceptions of Being a Smoker

Susan I. Woodruff, M.A., Terry L. Conway, Ph.D., Christine C. Edwards, M.P.H., John P. Elder, Ph.D., Shu-Hong Zhu, Ph.D., Linda K. Hervig, M.S., Suzanne L. Hurtado, M.P.H.

The effects of organizational smoking bans on individual smoking behavior have been examined previously, although benefits resulting from such bans are unclear. The present study examines the effect of a unique organizational smoking ban--8 weeks of enforced, involuntary cessation experienced by female U.S. Navy recruits during "boot camp." The Navy's complete ban on smoking is enforced 24 hours a day for the 8-week duration of boot camp. Approximately 2,000 young women identifying themselves as smokers at the beginning of boot camp will be assessed at the end of boot camp about their perceptions of being a smoker. Changes in perceptions among these women resulting from the 8-week ban will be presented, along with implications for the Navy in supporting this cessation once the women leave boot camp.